FOOD MANUFACTURE

Incorporating Food Industries Weekly

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FOOD MANUFACTURE

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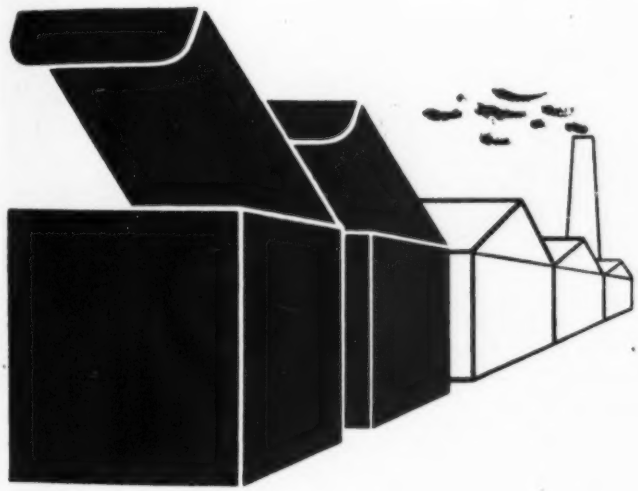

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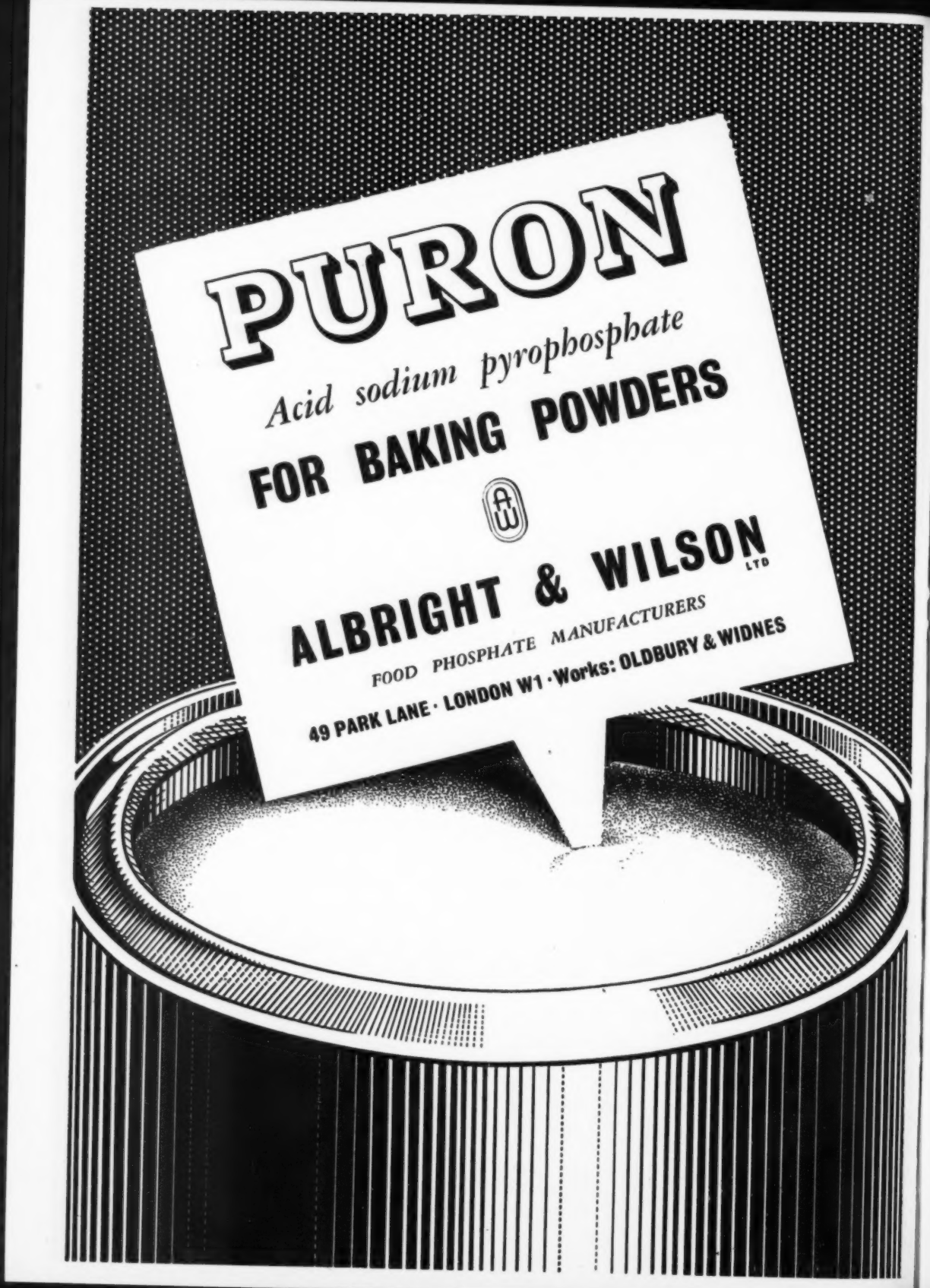
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World Meat Demands

THERE has plainly been a Ministerial decision, in the last month or so, that the people of this country are to be in no doubt regarding their meat supplies. The position is not expected to improve for some years; it may grow worse. A mere estimate that we should need a further 600,000 tons to raise us to the pre-war level of supplies is scarcely relevant. The population has meanwhile increased, and presumably the potential consumption of meat by the low income families would today be considerably higher than it was in 1938-9. To meet the demand we should probably require 2,800,000 tons rather than the 2,200,000 tons we normally had in the pre-war years.

A review of the available figures suggests that the more serious problem is the wider demand for meat in the world today. The U.S.A. is entering the Latin American market for canned beef more persistently than she has in the past, and if meat in Australia is to go off the ration, it cannot but mean a temporarily higher consumption. By all reports the South American communities are tending to consume more of their own meat products. This, it is maintained, partly accounts for the fall in Argentinian supplies, since the pre-war years, from 438,000 tons to 365,000 tons and in the total supplies from Uruguay, Chile, and Brazil from 84,000 tons to 21,000 tons.

To conjecture how far this process might go would not be very practical at the moment. Long before the war observers commented that we owed our relatively good meat position only to the low level of consumption in most other parts of the world. A spread of the international meat market over some of the Eastern European countries (let alone the possible rise in demand from the Far East) would obviously begin to bear heavily upon the restricted supplies of beef and mutton. There is, of course, no immediate prospect of this, but we should do well to realise that, once the taste for a little meat in the diet has been acquired, it is not readily given up.

The expansion of meat production in New Zealand is naturally the most hopeful sign. Meat imports from New Zealand have risen from a pre-war figure of 263,000 tons to 355,000 tons in 1948. It is not too much to say that this saved the 1948 ration, especially as the drought conditions in Australia had reduced the 1948 exports to this country to about 80 per cent. of the pre-war level. It is doubtful, however, whether New Zealand can safely raise her production much further, though she can probably hold it at the present level. The tendency is to look rather to Australia as the area most likely to come to the rescue, though possibly only after a term of years and a good deal of engineering.

A study of Australian reports shows clearly that there will be a conflict of policies before we can expect any spectacular development in that continent. Because of their scanty population and low yields, the Northern Territories, where the greatest advances may be made in stock-raising, have always been viewed by the Defence Authorities as the most adequate shock-absorber in the event of trouble with Japan or some other dangerous neighbour. The development of these areas would require large-scale irrigation schemes, vastly improved port and transport facilities, and a much increased population. Moreover, any manipulation of Australia's precarious water resources is bound to be experimental, and many unforeseen problems of pest and disease control may arise. By no means the least of the problems the country will have to solve will be that of building up fodder reserves to meet the unpredictable drought periods. Certainly these tasks can be undertaken; but it would be vain to deny that they represent major tasks in agricultural economics and in water and range control.

From Pessimism to Optimism

The early days of a year are usually occupied in taking stock of the currents of opinion. It is observable that volumes, mostly from American publishing houses, bearing such titles as *The World's Hunger* and *The Plundered Planet* are beginning to accumulate on the student's bookshelf. Several of them are fairly heavy with

statistics. Our own output at present in this field appears to be at once slighter and far more sober in tone, although it was perhaps Dr. Jacks of Rothamsted who started the fashion in the late 'thirties with his valuable *Rape of the Earth*.

During Queen Anne's time the population of the planet must have been about 500 million souls. Even when the Rev. Malthus was composing his final essay in 1800 it cannot have been more than 800 million. It seems to have touched the 1,000 million mark somewhere about the mid-century; and now after a further hundred years it has passed the 2,000 million mark. It is obvious that this rate of increase will have to slacken some time; at all events it will have to slacken if mankind is to live with the dignity and die at the advanced age we all conceive to be our due. The real question is whether the danger of over-population is imminent or may be considered as a more remote problem which humanity can prepare itself to face at its own leisure.

The latter is more likely to be the truth; and it is as well to appreciate what our own writers seem now to be emphasising, that the problem is in great measure one of internal agrarian reform within the different countries. After all, only about 10 per cent. of the food produced in the world passes annually into the world market. More than 90 per cent. is consumed in the countries where it is produced; and it is reasonable to assume that at least half of this is consumed within a few miles of the farms upon which it is harvested or fattened.

Publications such as the recent FAO report on Polish agriculture or the earlier survey of agriculture in the Middle East all insist more and more on the need for reform in land tenure, for the consolidation of minute and fragmented holdings into farms of economic size, for the development of co-operative farming methods in the purchase of seeds and fertilisers, and the marketing of produce. Our own literature today recognises the fact that if industry is to have the cocoa, the groundnuts, and the other produce it requires, the psychology of the native producers themselves will have to be tackled. That way lies the escape from the prevailing mood of pessimism that seems to be seeping across the Atlantic.

Overseas Trade Literature

It is almost unbelievable to learn from a Press release from the Commercial Relations and Exports Department of the Board of Trade of the increasing volume of complaints that the sale of United Kingdom products is handicapped because some exporters prepare their sales literature, catalogues, and brochures solely in English.

The note reiterates the need for such trade literature intended for distribution abroad to be in the language of the intended recipient; of equal importance is the use of appropriate monetary systems, weights and measures, etc., both in literature and in quotations and offers.

It is pointed out that buyers abroad are placed in considerable difficulty in assembling and maintaining machinery and mechanical or electrical apparatus delivered to them with instructions in English and not in their own language.

Naturally buyers abroad are placed in difficulties; but not only this, they will eagerly turn to the literature of exporters who take the trouble to understand the position. In view of the fact that this need has been rubbed into English exporters for at least the last thirty years, we should have thought that this shortsightedness mentioned by the Board of Trade was almost extinct; and it is reassuring to read that the majority of United Kingdom exporters do pay scrupulous attention to the needs and preferences of their overseas buyers.

But the mere fact of the need for a reminder suggests the existence of a not inconsiderable minority. If an English importer received two offers for the same goods (say) from South America, one couched in English, with prices quoted in sterling equivalents, and the other in Spanish with prices in "pesos per kilo," we can imagine who would get the order.

Progress in Lambeth

The Lord Mayor of Lambeth certainly believes in getting on with the job. In the December issue of FOOD MANUFACTURE we mentioned his promise to do something towards promoting a clean food campaign in his borough. Evidently a believer in the old adage that actions speak louder than words, the Mayor has gone all out to put his promise into practice, and the Lambeth Clean Food Association has been born.

Certificates will be issued to those traders who have taken reasonable precautions to safeguard against contamination all food sold or exposed for sale. The code of practice which must be complied with before the issue of certificates is thorough indeed. Hands and nails must be scrubbed clean before beginning work; smoking during the preparation and handling of food is forbidden; premises, with all their fittings and utensils, must be kept scrupulously clean; and

employees must immediately notify their employer if they are in an infectious condition or have been in contact with infectious disease.

It is to be hoped that the representations made to the Minister of Food for the provision of additional soap for employees of food traders in the district will not fall on deaf ears. It is hard to believe that co-operation will not be forthcoming in face of such enthusiasm.

It would seem a pity that the strenuous efforts of the food manufacturers to ensure the despatch of irreproachable products from the hygienic point of view should be neutralised by subsequent carelessness of those who dispense them to the public.

Botulism in Australia

A note drawing attention to two outbreaks of botulism in Australia, the first to be recorded in that country, was recently published in the *Medical Press*. These outbreaks, which occurred in November and December, 1942, were the subject of a report in the *Medical Journal of Australia* (July 10, 1948).

Although no specific bacteriological proof resulted from the investigations, circumstantial evidence pointing to commercially canned beetroot as the cause of the outbreaks was considered to be so strong as to be virtually conclusive. This finding is one of special importance inasmuch as commercially canned foods, at least in Great Britain and America, have played no part in botulism outbreaks for many years.

Out of 31 cases arising from the two Australian outbreaks, eight were fatal—a mortality rate rather lower than usual. In both instances the beetroots were served cold. In one of the outbreaks the suspected can was undoubtedly blown and the contents had an offensive odour and taste. The circumstances in the second outbreak were less clearly defined, but there was some testimony that the beetroot appeared and smelt abnormal. The two cans were the products of different factories.

Early in the investigation the authorities advised that no canned vegetables should be consumed without preheating to 100° C. for twenty minutes. Subsequently, when it appeared reasonably certain that canned beetroot was responsible, all stocks were withheld from consumption and eventually destroyed. It is pointed out in the report, however, that before the instructions became effective a large number of cans of beetroot from the batches to which the two affected cans belonged must have been consumed.

Unfortunately, the report gives no details of the heat-processing conditions to which the incriminated packs had been subjected, but it is stated that had the processing been at fault, it would be reasonable to expect a much higher incidence of spoiled cans than was actually found. It might be remarked here that a high incidence of spoilage is not the inevitable result of unsatisfactory processing. For example, localised under-heating affecting a small part of a load of cans may be caused by the presence of water or air in a retort. Such localised under-heating may not be reflected in the temperature or pressure records of a process. The importance of the proper design and operation of retorts in securing uniform heat distribution was stressed in a report issued by the National Canners' Association (1943. Supplement to Information Letter No. 934).

One of the reasons which the report suggests may account for the fact that further outbreaks did not occur is that only a small number of cans may have been contaminated, probably after being processed, or that they escaped processing altogether. In this last connexion, it surely must be rare that a system is lacking which ensures that every can produced is processed before leaving the factory.

Yeast in the West

No one would describe the United States as a particularly protein-deficient area of the post-war world. Her citizens may find their protein quota rather expensive, but they do not have official ceilings in terms of so many (or so few?) weekly pennyworths. Her farmers do not have to wonder quite as morbidly as ours where the protein in the feedingstuffs is coming from. It is therefore remarkable that there should now be two fairly large American factories operating a food yeast process—one in Los Angeles turning molasses into protein, and another in Wisconsin starting from the waste liquors of wood pulp and producing between 2,500 and 3,000 tons of dried food yeast per year. The variety used is reported to be *torula utilis*, developed by the Forest Products Laboratory in the course of research on the problems of wood wastes disposal.

The American attitude towards yeast protein seems predominantly to be one of disposal of troublesome wastes, and the intrinsic value of the protein that is produced is almost a secondary consideration. In practically every other country in the world the protein supply situation would reverse the order of these two motives. However, even in the fortunate United States the impor-

tance of a new production line for protein is being realised and more factories of this kind are likely to be set up. Often enough the conversion of a waste material into a saleable product is not an operation that can stand entirely on its own feet; the microbiological conversion of carbohydrate wastes into protein can not only stand firmly on its own budget of costs, it is now known to be the most efficient method of producing protein from an acre of soil. By the use of *torula utilis* several times more protein can be raised per acre than in the cropping of soya beans or peas; and that statement assumes that the carbohydrate material must first be grown for the "torula" factory and is not merely a crop residue left behind after other kinds of crop processing. The comment of an American chemical journal this year is that these developments have "a long-range agricultural significance."

For the rest of the world, and certainly for Western Europe, one would agree with the "significance" but discard the "long-range." If the waste liquors from the sulphited pulps of the paper industry can be turned into high-grade animal feedingstuffs, then it should be done without delay and wherever these wastes are produced in fair amount. If it is economic in a protein-sufficient economy, how much more economic it must be in protein-deficient economies! These waste liquors often give rise to pollution troubles, and consequently to the extra and non-returnable costs of treatment to obviate them. *Torula utilis* could save us dollars without intensifying our ordeal by austerity.

Motor-bikes for Frogs

Ever since we were youngsters swapping bulls-eyes for a sticky slab of toffee, or foreign stamps for a pet rabbit, we have had the urge to barter running in our veins. The columns of one of the weeklies devoted to exchanges of goods contain numerous examples of currency dispensed with; of such offers as a set of Waverley novels for a battery-charger; or perhaps a second-hand pair of boxing gloves. Our interest therefore warms to that report from the Redruth county court of a case where frogs "collected for medical purposes" and reckoned at 100 to the pound (in cash) figured as currency. "I should think no more inconvenient currency could have been found, since it is a form with great mobility, apt to disappear with greater rapidity than pound notes." So said the judge, ignoring the connexion between "currency" and "mobility." Not only are frogs more "current" than common currency, we add; but we shudder to think of the inflation once the tadpole season sets in! 2,500 frogs equals one motor-bike plus sidecar: or so the bargainers had agreed. We hope the bike would go, for the frogs certainly would if not well confined.

We proudly offer this example to our American friends against that record long claimed by them for ingenuity in barter, in which the agricultural student brought farm produce as part of his fees. But the little pig that went to college and sent back a doctorate in rural economy seems no stranger than 2,500 frogs from one pool in Redruth sending off a motor-bike for another kind of "Pool."

100 Years Ago

Grumblers who never partake of a meal in a London restaurant without some grouse at table may find material to prove their verdict in Cunningham's *Guide to London* published a century ago. In those "good old days" if you were passing Leadenhall Street you had but to pop in the Ship and Turtle Tavern to sample "some of the best turtle in London." Or further along to Fleet Street, to the Cock Tavern "after the theatre" when "London oysters and London porter would be enjoyed to perfection." Cunningham puts "The Thatched House" high on his list. "If you can excuse an indifferently clean table-cloth, you may dine cheaply and well" at the Cheshire Cheese in Wine Office Court off Fleet Street. All tastes are catered for, from the Clarendon Hotel's "expense no object," with dinners as high as 5 guineas a head (when guineas were guineas), down to "Joe's" in Finch Lane, Cornhill, which is the place for "a chop, a steak or mealy potatoes"—"but the beer is bad," adds the candid Cunningham. The *élite* of London, 1849, could join either the Beef Steak Society behind the scenes of the Lyceum, a coterie calling themselves "the Steaks" and dedicating themselves to "Beef and Liberty." Or there were other Beef Steak Clubs with a gold gridiron as badge or emblem; clubs or "great wits and men."

> He that of honour, wit and mirth partakes
> May be a fit companion o'er Beefsteaks.

The very sound of some of Cunningham's recommendations sets the saliva flowing. Nor were there in 1849 any disturbances like that riot earlier at the Haymarket, all because a man had announced he would, during one of the performances, creep into a quart bottle!

Five Acres of Sweetness

All the departments of Horner's sweet factory at Chester-le-Street are run with smoothness and efficiency. With perfect regularity, from boiling pans are delivered batches of toffee to be handled by the girl operative who guides the material into the maw of a machine which spits out ten artistically wrapped toffee pieces every second. Automatic devices are also paramount in the boiled sweets department, but handwork by skilled craftsmen is carried out where operations do not lend themselves to mechanical methods.

THE original premises of the prosperous and progressive firm of George W. Horner and Co., Ltd., were owned by Mr. John W. Luccock and used for manufacturing jams, lozenges, jubes, pan goods, and hard-boiled sweets. The business was taken over in 1902 by J. Samuel and Co., Ltd., and was continued for five years on practically the same lines as before. In July, 1907, Mr. George W. Horner took over the business which at that time employed eighty operatives. Mr. Horner, then a young man with a sound business training, full of enthusiasm and determination, set about extending the business which previously had been confined to the counties of Northumberland, Durham, and North Yorkshire. This entailed additions to the buildings, the plant, and the staff.

Mr. G. K. Horner, managing director of George W. Horner and Company, Limited.

In 1910, to meet the demand for slab toffee in 4 lb. trays and ½ lb. slabs, a new department was opened for making "Mermaid" and "Playtime" toffees. These lines met with immediate success, and many tons were turned out weekly. Later, the demand for wrapped toffee pieces and wrapped caramels necessitated the erection of additional buildings and the acquirement of new machinery. Further new lines —"Dainty Dinah," "Boy Blue," and "Fairy" toffees—were introduced in 1912 and maintain their popularity to the present day. The business flourished exceedingly and as a consequence space was still found to be inadequate for the rapid developments. Mr. Horner therefore decided to dispose of his jam business and confine his activities to the manufacture of toffees and boiled sweets of high quality.

Further expansion ensued with nation-wide sales, rendering it necessary for the company to open depots throughout the country from which their own vans undertook deliveries direct to retail customers. In the meantime the eighty employees of the original concern had increased in number to nearly one thousand.

Raw Materials

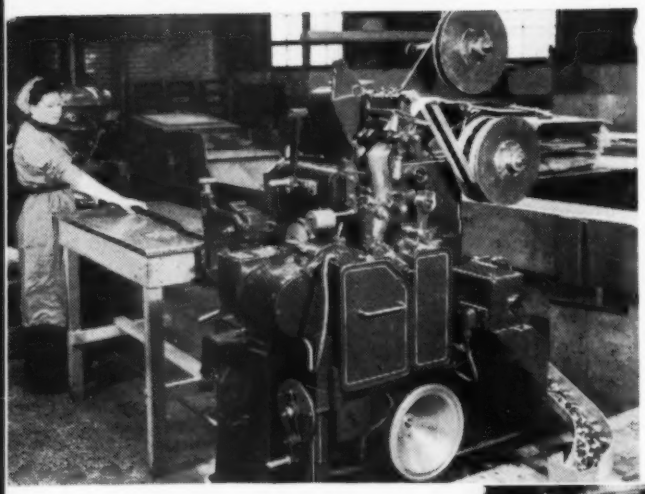
Raw materials used in the manufacture of toffee and boiled sweets are cane and beet sugar, glucose, butter, golden syrup, hydrogenated palm oil, couverture, condensed or evaporated milk, nuts, raisins, honey, essential oils, essences, and flavouring. Colours are used in boiled sweets only.

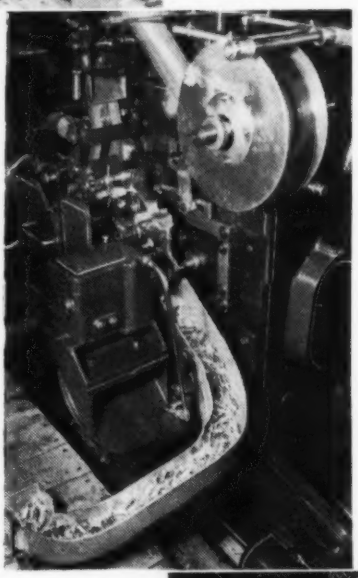
Eighteen-ton rail tankers and seven-ton road tankers supply the glucose which, on arrival, is pumped into steam-heated storage tanks and then as required to the two- or three-ton capacity tanks in the various departments from which it runs by gravity to the individual boiling pans. Butter, an important item among the ingredients used, is stored on arrival at the factory in a refrigerated cold room. Most of the raw materials are delivered by road, or collected by the company's own transport as return loads.

To ensure the elimination of foreign substances, a strict examination of the contents of all sacks, barrels, and boxes is carried out in the stores before their despatch to the different manufacturing departments.

Toffee Manufacture

The manufacture of toffee is carried out in its own departments. It is semi-automatic and,





Above: **Toffee rope being fed from the batch roller into the automatic cut and wrap machine.** *Centre:* **Wrapped toffees emerging from a machine at the rate of ten a second.**

broadly speaking, three shapes are made—roll pieces, finger pieces, and squares.

In the making of roll pieces, the boilings of toffee enter a batch roller from which the toffee emerges in continuous rope form. After passing through a prefeeder this is fed into automatic cut and wrap machines which produce 400 pieces of toffee a minute wrapped in overstrip—aluminium foil laminated with waxed paper or cellulose film or waxed paper. A notable recent addition to these machines is one which turns out 600 toffee pieces per minute—or ten every second.

The wrapped sweets at the time of delivery from the machines are still plastic, and are carried by a conveyor band on which cool air is blown on to an elevator. From this sweets cascade on to an inspection table illuminated by fluorescent lighting where trained operatives remove any faultily wrapped pieces.

After inspection, the wrapped pieces are filled into 7 lb. tins for the home and export trade or taken in boxes to another department for inclusion in assortments.

Finger and Square Pieces

In another department finger and square pieces are produced. Boiling pans of the usual type are used, all of which are well-lagged whereby an economy of fuel amounting to no less than 30 per cent. has resulted.

Glucose is fed from the storage tanks by gravity into the pans and is mixed with the other ingredients. Steam is then turned on and the mixture agitated while cooking. An interesting little operation consists of the addition of scrap toffee five minutes before the boil is ready. This has been found to improve the texture and flavour of the sweet. The end of the operation is judged by sugar boilers with long experience, but a final "snap test" is made by dipping an iron bar coated with toffee into cold water.

The finished toffee is discharged from the pans into baths in which the toffee is carried to water-cooled tables, equalised by a machine to a predetermined thickness, after cooling, marked into rectangular slabs by the same machine, and finally cut into individual slabs by means of a circular hand cutter. These slabs are stacked with waxed paper between until they are ready to be cut through by toffee-cutting machines to within 1/16th of an inch into oblongs or squares, trimmed at the edges, and then placed on the vibrator table (called "the rattler") which breaks the marked slabs into separate pieces, when they are ready to proceed to the wrapping machines.

To produce chocolate-covered toffees the pieces are passed through the usual type of enrobing and cooling machine.

Boiled Sweets

A separate department is devoted to boiled sweets manufacture in which the sequence

Below: **Chocolate-covered toffees emerge from the enrober.**

of operations differs somewhat from that followed in the production of toffee. A large range of varieties and flavours of boiled sweets is made in this department, starting with the basic mixture made by placing the sugar, glucose, and other ingredients in a steam-jacketed copper pan in which they are melted to a syrup. This is conveyed by means of a pipe into another copper pan fitted with agitators, and, when ready, is pumped into the top of the automatic cooker consisting of a steam-heated spiral tube down which the syrup runs in the grooves of the tube. On reaching the bottom the syrup, heated to a temperature of 325° F., and being fully cooked, is dispersed on to a circular revolving water-cooled table. When partially cool, the mass is removed from the table in 7 lb. batches and transferred to another cooling table, where it is turned and rolled until it is in a suitable

The finished toffee is discharged from the pans into baths.

The toffee is poured on to water-cooled tables and equalised by a machine to a predetermined thickness.

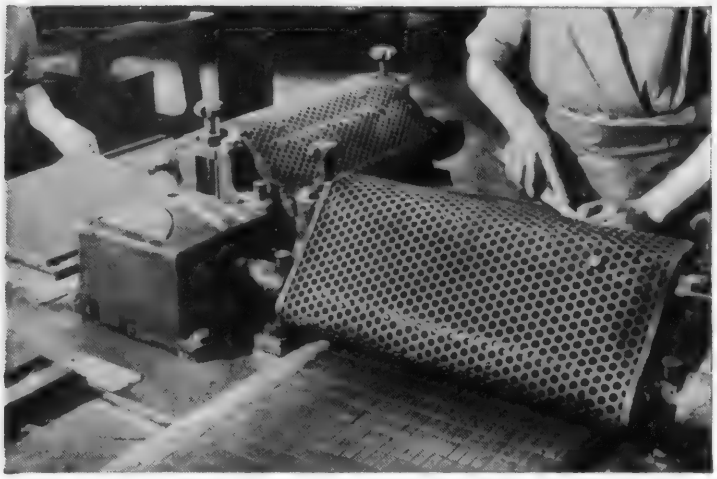
condition for placing in the batch rollers and thence to the die stamping machines.

An ingenious piece of equipment is the rotoplast soft centre machine, by which a batch of high-boiled sugar casing is placed in the batch roller around a long copper tube. The jam for the centre is placed in a hopper connected to a pump by which it is forced down the copper tube. The casing at the end is in the form of a cone at the point of which the jam emerges and is pumped into the centre of the casing, which then proceeds in rope form through a series of sizing wheels which gradually reduce the size of the rope to the desired diameter. The rope is automatically fed into the dies which stamp out the sweets. These emerge in ribbon form from the dies and travel along a three-tiered wire belt on which cold air is blown to cool the sweets which are then ready to be wrapped.

Several kinds of wrapping machines are used in addition to the cut-and-wrap type mentioned in connexion with toffee making. The majority of the toffee output is wrapped on machines to which the individual pieces are fed by operatives into a chain feed band and are then automatically wrapped in waxed paper or cellulose film.

The chocolate-covered squares are mostly wrapped in printed coloured aluminium foil in machines which employ brushes to brush the foil

After cooling, the toffee is cut into individual slabs by means of a circular hand cutter.



Slabs of toffee are cut into individual pieces and then broken up by vibration ready for the wrapping machines.

round the sweets instead of metal twisters as with waxed paper or cellulose film machines.

The boiled sweets are wrapped by machines which twist-wrap the sweets in either waxed paper or cellulose film at speeds up to 160 per minute. By means of interchangeable feed plates it is possible to wrap a great variety of sweets on the same machine.

Some boiled sweets are wrapped in either waxed paper or cellulose film on machines which, after folding the paper or film round the sweets, pass it over a heater which momentarily melts the wax or film to enable a heat-seal to be made.

A great range of wrappings made of various materials and printed in many exclusive designs and colours is used.

The company takes great pride in their packaging and maintains a very high standard. For the home trade all goods must be despatched at present in 7 lb. tins which are fully printed; for toffee products the tins are rectangular in shape with slip lids, and for the boiled sweets square with screw caps. The tins are either tied with string or sealed with cellulose tape before being despatched.

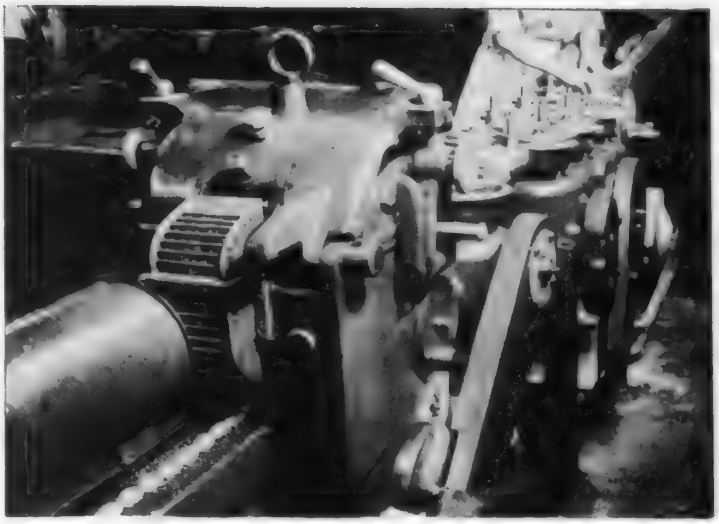
For the export trade new tins only are used; after being packed, they are sealed with cloth adhesive tape, wrapped in brown paper, and labelled.

Boiled sugar syrup flowing from an automatic cooker on to a circular, revolving, air-cooled table.

A batch of butter drops is fed into the die stamping machine, cooling being completed on an air-cooled conveyor.

In addition to 7 lb. tins various other forms of packing are used for the export trade. All the company's specialities are available in 5 lb. bevel glass jars fitted with plastic caps. The sole British packing rights have recently been obtained for the airtight type clamp top canisters. A very extensive and fine range of fully printed fancy enamelled tins is also used, the popularity of which is demonstrated by the fact that over half a million of these tins were sold in eighty-five markets during the six months ending middle December, 1948.

All goods for export are packed in either wooden cases or fibreboard cartons, secured with steel banding, and lined with waterproof paper.



Paradise Fruits emerging from the dies of the rotoplast soft centre machine.

Long distance vehicles for home trade and for the conveyance of export cases to the docks form part of the company's transport fleet, while light vehicles are used for delivery within a radius of sixty miles. Deliveries to remaining customers are made by contractors, the goods in bulk being sent to their depots.

The ramifications of the company's trade extend from Land's End to John o' Groat's, and to Northern Ireland, representing 23,000 accounts. Before the war every customer was called upon once every five weeks. This employed a sales force of over seventy travellers. In the same interval a special

Packing into half-pound fancy tins. The lid is sealed with adhesive tape and each tin wrapped in waxed paper.

The special double fibreboard carton has eliminated practically all breakages.

selling campaign was carried out when new lines were introduced and national distributors visited.

During the war such activities were impossible, and at present fourteen representatives cover 40 per cent. of the accounts, the intervals of calling being between eight and twelve weeks. The remaining 60 per cent. are circularised at the same intervals.

SUPPLIERS OF EQUIPMENT

Batch roller: *The Forgrove Machinery Co., Ltd.*
Waxed paper: *Waxed Papers, Ltd.; British Waxed Wrappings, Ltd.; Griffiths and Diggens, Ltd.*
Wrapping machinery: *The Forgrove Machinery Co., Ltd.; Rose Bros. (Gainsborough), Ltd.*
Fluorescent lighting: *The General Electric Co., Ltd.*
Equalising machines: *J. Hounsell.*
Pans: *Brierley, Collier and Hartley, Ltd.*
Internal industrial tractors: *Lansing Bagnall, Ltd.*
Cellulose film: *Transparent Papers, Ltd.*
Aluminium foil: *Wraptyn and Co., Ltd.*

Two Books on Nutrition

"HUTCHISON" first appeared in 1900, and the appearance of a tenth edition* demonstrates how well it has established itself as a classic. It is particularly interesting to see how this book has adapted itself to the enormous changes which have occurred in what must be one of the most rapidly advancing sciences. It is apparent at once that the revisers have not failed to appreciate these changes. The most obvious alteration in the book is the increasing emphasis on the fundamental aspects of nutrition. Thus, the first section of the new book occupies about 280 pages, compared with 200 in the 1940 edition, and 80 in the 1933 edition.

This part of the book is a very readable account of general nutrition and—new to this edition—it contains chapters on hygiene and on the processing of food. Nutritional literature and teaching have suffered a great deal from a tendency to be too definite and dogmatic. The variability of the individual seems often to have been ignored, and our complete lack of knowledge of some aspects seems frequently to have been masked by an enormous array of observations on other aspects. It is gratifying, therefore, to see that the revisers have here stressed continually the gaps in our knowledge and the inadequacies of our theories. It is perhaps because of this critical approach and the delighttul style of this part of the book, that one tends to notice more the occasional, unwarranted statement and insecurely based theory.

The second part of the book is now a reasonably brief account of the properties of food. This is an unusual but interesting and, in many ways, important aspect of the subject which many nutritionists seem to neglect entirely. There is again, however, a suggestion in this part that the revisers might have been just a little more careful to eliminate some of the older work and, especially, references to proprietary foods which have for a long time not been manufactured.

The third part is on infant nutrition. The subject of nutrition is one which tends to attract controversy and bias, and it is probably true to say that more different theories and methods have been advanced in the matter of infant nutrition than in any other part of the subject. Nevertheless, recent years have seen a tendency to clearer and more critical thinking amongst pediatricians, and there is now a concensus of opinion in many hitherto debatable aspects of the subject. It is a pity, then, that this section, written by Dr. C. F. Harris, tends to perpetuate much of what is now discredited. In fact, some of the statements made in this part of the book do not agree with the general principles outlined in the first part.

The fourth and last part deals with diet and disease, and of particular interest is a critical description of several dietetic systems which have been described from time to time.

It should not be thought that the criticisms made here mean that this classical book is still not the best and most informative book of its kind. It is just because one expects so much from it that one tends to notice its shortcomings. It is certainly a book which anyone interested in dietetics cannot do without.

A smaller book,† which is in many ways a shortened version of "Hutchison," has recently been published. It gives a lively and interesting account of the science of nutrition, which is enhanced by frequent personal notes and comments. It is unfortunate, however, that these and indeed some of the more formal matter is not a little more accurate and up to date. How, for example, is one to interpret the suggestion that rheumatism may be cured on a low salt diet? There are at least four quite different diseases popularly known as rheumatism, and the reviewer knows of no real evidence that any of them can be cured on such a diet. Again, dessert apples are included in foods of "little value for their ascorbic acid content," and of rickets it is said "it has now almost disappeared." Both of these statements are misleading as they stand, for some varieties of dessert apples contain appreciable amounts of ascorbic acid and mild rickets is still not at all uncommon. Provided that the reader is careful to avoid being influenced by such points as these, the book will provide him with more interesting information about nutrition than many books which are far larger. We look forward to the second edition, prepared a little more critically, for there is no doubt that a book of this sort will prove most popular.—J. Y.

* *Hutchison's Food and the Principles of Dietetics.* (10th Edition.) Revised by V. H. Mottram, M.A.(Cantab.), and George Graham, M.D., F.R.C.P. Pp. 727+ xxviii. London. Price 21s. net.

† *Human Nutrition.* By V. H. Mottram, M.A.(Cantab.). Pp. 267. London. Price 6s. 6d. net.

The Baking Industry

Progress in 1948

S. WALTER BUTTERWORTH, B.Sc.(Tech.), F.R.I.C.
Birkett and Bostock, Ltd.

IN his book on industrial research, Hill[1] says that the Mellon Institute at Pittsburgh, Pennsylvania, arose directly from the work of John Kennedy Duncan. "Duncan established his first industrial research fellowship at the University of Kansas in 1907. It was for an investigation into the *chemistry of baking*." Andrew and Richard Mellon invited Duncan to develop his ideas in the University of Pittsburgh and his success resulted in the foundation of the Mellon Institute of Industrial Research.

This link between baking and "the best known and most successful industrial fellowship laboratory in the world" may, in itself, amount to little, but it could be one of those intangibles that can help to foster the spirit of enterprise and teamwork in a bakery research association.

It would be an interesting task to gather together the details of these transactions of nearly half a century ago. If some original letter or document concerning them could be found it might fittingly be housed at Chorleywood as a reminder of the link with the Mellon Institute. The B.B.I.R.A. is now entering upon a difficult period in its existence. The founders feel that their efforts to establish a research association for the industry have succeeded and subscribers begin to look forward to results.

Problems of a Research Association

In endeavouring to satisfy this very natural desire, a research association is almost inevitably tempted to tackle the urgent problems that lie nearest to hand and to neglect in some measure the long-term, unspectacular, fundamental research that takes years to develop and mature.

On the other hand, work on pressing problems often indicates the need for some long-term investigation. Hill,[2] in a paragraph on the philosophy of research, says: "Research must be no hothouse plant to fade and wither at the first blast of criticism or the cold air of disappointment. Too many research associations lead stunted lives stultified by their own usefulness. *Ad hoc* enquiries and hand to mouth acceptance of immediate problems are occupying their time and effort and preventing them from envisaging . . . the promised land of programmed fundamental research into which they should enter."

The B.B.I.R.A. is now facing stage two of its journey, and there is every reason to believe that its undoubted success in tackling the inaugural stage will be continued. Members of the baking industry can best help themselves and their research association at this time by seeing to it that the financial target for the year[3] is quickly achieved.

Education in the Industry

"Under the national and regional schemes the old technical college, with its haphazard mixture of junior and senior work and its aimless drift in the current of local demand, ceases to be." Thus *Chemistry and Industry*[4] comments on many paper schemes of reorganisation based on the Percy Report.

It is, perhaps, a blessing in disguise that the inevitable long delays may give time for thought before the needs of local industry are ignored. In the meantime, there is the "haphazard mixture" as before, only more so—with 5,054 bakery students at seventy-two centres in 1948 as compared with 2,772 students at fifty-two centres in 1938. If the increase in wisdom is proportional to the increase in the number of bodies then there is progress even though it be "aimless and drifting."

Courses for Bakery Teachers

A short course for bakery teachers was held at Crewe Hall, University of Sheffield, in July. So much lecturing and discussion was crammed into a few days that mental indigestion was almost inevitable. At least as much of real value was gained from the usual midnight arguments as from the official lectures. (And a small party of truants saw Yardley, captain of England, make a faultless century against Surrey on a dark, clouded, yet sunny Saturday—an education in itself!)

An interesting paper was given by P. S. Jewell of the Cambridgeshire Technical College. He was ably assisted by a colleague, Mr. Hanneman. Jewell's subject was the teaching of bakery science, and he put on a first-class demonstration allied to an adventurous approach to the job. He used a method very similar to that of Cranston[5] which, although it has been the subject of some criticism, is the 1948 method if the teacher is fully capable of putting it across and if the students can keep pace. There was no doubt about the ability and enthusiasm of the Jewell-Hanneman combination. This was one of the best efforts of a very enjoyable few days.

The Royal Technical College, Glasgow, is breaking new ground in bakery education by providing a full-time course in management, while more atten-

tion than usual is being paid to engineering problems and industrial administration. The number of places available is very limited. The fees are nominal and so fail by a very long way to reach the thousand pounds a year demanded for the training of two students in a recent trade advertisement. The significant point about this advertisement is not so much the magnitude of the sum as the reasonable probability that someone will pay it.

Technical Literature

The best technical book published in 1948 was *Plain Words* by Sir Ernest Gowers. It deals with the technique of writing. It is asking for trouble to mention the book, because reading it develops the critical faculty so much that it is almost impossible to write two consecutive words without wondering if they will affect the reader "precisely as you wish." R. O. Kapp[6] follows in Sir Ernest's footsteps. His book well repays careful study, and he has some very helpful paragraphs on the use of "functional English," but *Plain Words* tells a plainer tale at one-third of the price.

Although these small books have nothing to do with baking as such, they cannot fail to help anyone who has to prepare a clear report of a technical investigation. A similar comment applies to the S.P.A. papers on "The application of statistical methods to food problems."[7] D. J. Finney, in his introductory paper, emphasises the importance of "the cultivation of a statistical habit of mind." J. D. Mounfield, in a lecture on "Test Baking,"[8] has given a simple example of the value of calculating standard deviations in breadmaking studies.

Progress in Experimental Technique

The development of a new experimental technique can often advance knowledge in many different fields. A good example of this is provided by the recent rapid progress in chromatographic methods which has led, among other things, to a better understanding of the nature of proteins. Although the original work was done over forty years ago, the work of the Wool Research Association has now enabled all the amino acids in wool to be identified in a 0·002 g. sample.[9] The technique should have valuable applications in the study of wheat proteins. Barmore,[10] in a useful review of recent literature in this field, discusses the changing ideas about gluten and the evidence against the well-established glutenin-gliadin concept.

There has been little of baking interest published in the *Rheological Abstracts*, but a paper by Ward and Westbrook[11] on the extrusion of mastics stimulates thought on the extrusion devices used in the evaluation of the baking quality of wheaten flours.

J. King,[12] whose work during the war gives him almost unique authority to deal with such matters, discusses the scientific problems in feeding a modern army in the field. His references to bread and biscuits are brief, but they are enough to make one look forward to the time when he can deal with this aspect of his subject in much greater detail.

Nutritional Research

In the nutritional field the recent reports of Widdowson's work on the value of bread in the diet has caused both bakers and millers to look forward with interest to the publication of her detailed observations. It is to be hoped that publication will not be too long delayed. The Minister of Food, in remarks reported in the public Press, seemed inclined to ignore any nutritional evidence that did not favour a continuance of the compulsory use of long extraction flours. Such an attitude is not uncommon even in quarters where impartiality should never be in doubt.

Some of the contributions to *Cereal Chemistry* during the year have emphasised the difficulty of keeping up with new experimental methods. Laws and France[13] have been using the Tiselius electrophoretic technique to investigate the protein fractions of wheat flour, and their observations appear to add support to the idea that the main gluten protein is a single complex. They indicate that "the state of gluten development" is more responsible for the baking quality of flours than either chemical composition or the amino acids present in the protein fraction.

Estimating Baking Quality

Spinks and Tollefson,[14] using a radioactive tracer technique which "may be of value as a quick method for estimating baking quality," use terms familiar to the atomic physicist in describing their work, and they accentuate thereby the difficulties of keeping up to date previously mentioned. Their reference to "the presence of interfering daughters" is followed by the statement that "Ru^{106} decays with emission of beta particles, energy 0·03 Mev, to give rhodium, half-life thirty seconds." The way of the bakery technologist does not become any easier.

Nettie Esselbaugh[15] reports on the influence of bentonite on bread quality, and compares the effects observed with bromate on flours of varying gluten value. Walden and Larmour,[16] continuing their experimental baking tests, deal with the combined effects of yeasts, salt, and sugar on gassing rates, but the baking formula used contains so much milk, fat, sugar, and malt, as well as a 3 per cent. (based on flour) yeast level that it is difficult to translate their results into terms of commercial practice in this country.

The continued interest in silicone products for bread tin glazing gave added interest to a paper on the silicones by H. J. Emeléus in *Science Progress*.[17]

Publications in 1948

Among the items of particular interest to bakers that appeared in FOOD MANUFACTURE during the year, the detailed description of the production of *panettone*[18] deserves especial mention. This rich fermented fruit cake is made on a large scale by the Motta Company of Milan, whose process was outlined and illustrated.

E. V. Paterson's paper[19] on oven chain lubrication surveyed such progress as has been made with this difficult problem. Paterson stated that successful lubrication can be obtained at temperatures over 750° F. with "the latest chain lubricants." Some reference to the possible advantages of silicone derivatives as constituents of chain lubricating mixtures would have been of interest.

The illustrated article on the "Wonder Bakery"[20] gave a good example of what can be done on a new site in mechanised bread bakery planning.

It is interesting to compare layout and equipment in this country with American practice as exemplified by the new plant of the Fuchs Baking Company in Miami, Florida,[21] and that of the Holsum Baking Company at Harlingen, Texas.[22] References to the pilot scale plant for breadmaking recently installed in the Kansas State College[23] and in the Oklahoma A. and M. College[24] recall the fact that no technical college in England has adequate facilities for studying the production problems inseparable from the large-scale manufacture of bread and flour confectionery.

This brief summary of some of the publications that have interested at least one baker in 1948 may be concluded by a reference to the Annual Reports on the Progress of Applied Chemistry, 1947, in which references to breadmaking fail to achieve the dignity of a paragraph heading, and references to flour confectionery and biscuits occupy an equally humble place. This is perhaps unfortunate, but the responsibility rests with the baking industry rather than with the publishers of the reports.

Quality Control

The bread baker's chief raw material is flour, and just as it is said that there are "horses for courses," so there are said to be flours for processes —high gluten flours responding best to severe fermentation conditions and low G.V. flours giving the best bread under kinder conditions. Like all generalisations, this idea needs qualification. There are some flours from which only second-rate bread can be baked even under the conditions best suited to them. Hence, even in bakeries where there is a reasonable degree of quality control, bread quality fluctuates with flour quality. Careful study can and does smooth the wilder peaks and depressions of the flour character curve so that bread can be expected to stray a little less from the optimum than does the flour from which it is made.

This charitable hypothesis has been subjected to severe strain, however, during the latter part of 1948. With a wet harvest and a good deal of poor English wheat about, with English at 40 per cent. or more of the grist, and often a significant proportion of sprouted Australian in addition, with grists giving a low flour yield and much scratching and scraping to make 85 per cent. extraction, high maltose figures (often between 4 and 5), and an appreciable decline in gluten quantity, it is difficult to maintain bread quality at the level which brings an expression of satisfaction and even of some pride to the face of the knowledgeable craftsman.

Flour Confectionery

Limited supplies of the major raw materials—fat, sugar, eggs, and dried fruits—have kept flour confectionery at an austerity level in quantity and often in quality. Production difficulties have been eased slightly by improved supplies of jam and by the import of "bakery creams," later called "sweetened fats." These materials, from such European countries as Denmark, Holland, and Norway, are blends of fat and sugar in varying proportions sometimes mixed with water, separated milk powder, and glucose. They are sold at a controlled price of two shillings a pound. The baker may have paused to wonder why scarce materials should be blended together in different ways so that formula rebalance was repeatedly necessary; the price may have puzzled him, too. Such mysteries, however, were less important than the fact that these imported concoctions—only to be imported by approved persons—helped appreciably in the maintenance of a limited output of confectionery. Carob bean juice and saccharified starch syrups were sold in some quantity, although neither is the perfect sweetening material for first-class bakery products.

The continued shortage of milk powder led to a renewed interest in whey preparations and lactose of various qualities has been used to produce surface colour during baking.

The great interest shown in the Royal wedding cakes of 1947 was renewed in the designing and making in 1948 of Royal christening cakes. Events like these are simple, heartening, and cheerful. Even those bakers who in their perplexity have resembled the "confused flour beetle" feel that their confusion is rather less confounded at such times.

REFERENCES

[1] *Co-operative Research in Industry*, p. 116, D. W. Hill.
[2] *Ibid.*, p. 135.
[3] *Food Manufacture*, 1948, p. 182.
[4] *Chemistry and Industry*, 1948, p. 34.
[5] *A Rational Approach to Chemical Principles*, J. A. Cranston.
[6] *The Presentation of Technical Information*, R. O. Kapp.
[7] *Analyst*, Vol. 73, p. 2.
[8] *Milling*, 1948, p. 363.

(*Continued on page* 110)

Evaluation of Foods

FACTORS other than taste and aroma to which attention must be paid in order to get an accurate evaluation of all the attributes of a food were discussed by L. C. Cartwright and R. A. Nanz at the symposium on food quality and control held by the Division of Agriculture and Food Chemistry of the American Chemical Society in Chicago in 1948.

The total score given when evaluating food by panel testing should include colour, texture, and judgment of the quality during mastication. The psychology of these flavour factors has been expressed in the Weber-Fechner law, which relates chemical composition of a mixture to the discriminatory differences in taste-thresholds. Threshold expressions on factors other than salt, sugar, and acid tastes have been studied and viewed in the light of this law, and useful facts have evolved. These include the factors of oiliness in fatty foods, sweetness in spiced foods, and the well-known glutamic taste.

Certain nutritional factors contribute to the pleasant flavour of many foods. This enhancement of flavour tends to promote increased use of the foods in the diet, and leads to a better nutritional intake through this beneficial self-selection. The fat-soluble vitamins, thiamine, *a*-tocopherol, and other B-complex factors, contribute a detectable aroma factor to the flavour. In pork, liver, yeast, and wheat products, these vitamins are an important part of the body of flavour. The antioxidant effects of ascorbic acid and *a*-tocopherol help in the preservation of flavour factors. An example of this is the subtle pleasant flavour of paprika and its ability to stabilise and contribute to the pleasing flavour of the food in which it is incorporated.

Dairy Research

THE results of the work of the seven departments of the National Institute for Research in Dairying at Shinfield are contained in the report for the year ended September 30, 1947.

In the Dairy Husbandry Department work has been continued in the control of contagious abortion and mastitis. Work in connexion with the stimulation of milk production in cows by feeding with iodinated protein has been carried on by the Feeding and Metabolism Department, and experiments have been conducted in collaboration with the Department of Chemistry to ascertain the effects of different rations on milk yield and composition.

Studies on experimentally induced mammary development and lactation in the goat have been continued by the Department of Lactational Physiology in collaboration with Mr. K. C. Richardson of the Department of Anatomy, University College, London.

Bacteriological and Chemical Research

The Bacteriology Department has carried out experiments to study the role of various bacteria in the development of flavour in ripening cheese and the effect of temperature and time of pre-test storage of milk samples on the keeping quality, dye-reduction time, and colony count. Other work included investigations into H.T.S.T. pasteurisation, chlorine wash for milking machines, and the sterilisation of milking machine clusters with alkaline detergents.

Chemical research into the compositional quality of milk and other analytical work has been continued. Investigations into the phosphatase test have led to the development of a new, rapid, and sensitive technique for determining the residual enzyme activity of pasteurised milk.

New Buildings and Sections

The new buildings of the Dairy Engineering Department were occupied at the beginning of the year under review, and in September, 1947, the organisation of an instrument section was begun. This section will study instrumentation problems in the dairy industry, and will provide facilities for the design and manufacture of specialised instrument equipment needed by the department or by other departments of the Institute.

Protein studies and research into the nutritional role of the microflora of the alimentary tract, the nutritional significance of colostrum, and vitamin A metabolism were carried out by the Department of Nutrition. The development of methods for the measurement of vitamins was also investigated.

The report also contains a brief review of the work of the cod liver oil (poultry) standardisation laboratory and a list of papers published during 1946-1947.

The Baking Industry

(*Continued from page* 109)

[9] *Science To-day*, Vol. 4, p. 230.
[10] *Bakers' Digest*, Vol. 22, p. 10.
[11] *J.S.C.I.*, Vol. 47, p. 389.
[12] *Chemistry and Industry*, 1948, p. 739.
[13] *Cereal Chemistry*, Vol. 25, p. 231.
[14] *Ibid.*, p. 139.
[15] *Ibid.*, p. 280.
[16] *Ibid.*, p. 30.
[17] *Science Progress*, Vol. 26, p. 285.
[18] *Food Manufacture*, 1948, p. 101.
[19] *Ibid.*, p. 417.
[20] *Ibid.*, p. 497.
[21] *Bakers' Digest*, Vol. 22, p. 54.
[22] *Ibid.*, Vol. 22, p. 106.
[23] *Ibid.*, Vol. 22, p. 108.
[24] *Ibid.*, Vol. 22, p. 15.

Harvesting groundnuts in Nigeria.

Vegetable Oil Resources of West Africa

There can be no doubt as to the potentialities of West Africa as a source of oleaginous products. During and since the war West African exports, chiefly of groundnuts and palm kernels, showed marked expansion; yet the quantities, though impressive, do not reveal the capacity of the vast region, including British, French, and Belgian territories, all of which are concerned with these shipments.

IT is not enough merely to visualise actual possibilities; it is equally necessary to grasp the fact that adequate results can be obtained only by a realistic attitude and procedure. In the case of palm kernels, for example, it must first be recognised by all directly concerned, especially the Africans themselves, that the introduction of a more modern technique is imperative. The current method of procuring the kernels is crude and defective to a lamentable degree, involving a heavy percentage of loss.

Replacing Primitive Methods

Garnering, for instance, is carried out by the primitive method of lopping off the fruit in bunches and allowing them to fall from great heights. Improvement might be found in the adoption of something like a rope-and-pulley contrivance. However, garnering is merely one of the items which must be tackled. The West African industry must face the intense competition from Malaya and Indonesia, and come into line with their methods of cultivation, harvesting, and treatment which are conducted under scientific management in plantations.

Scientific methods afford increased yields and reduce costs, and it is not unreasonable to predict that by their adoption in West Africa increases in output amounting to 75 per cent. to 100 per cent. might result. Great benefit would accrue to the West Africans themselves in the direction of improved nutritional standards.

The local groundnut industry is obliged to compete both in price and quality with those produced in many other parts of the world. Although the commodity will be in short supply for a considerable time, any agricultural laxity in the initial stages of the industry will be inimical to the final success of the project.

Apart from the competition between groundnuts and groundnuts, the product is being sold against other oleiferous products, particularly cottonseed, and must compete both in quality and price for the favour of margarine manufacturers.

The Shea Nut

It seems anomalous that shea nut butter has received comparatively little attention in recent years, although at one time it seemed likely to become prominent as an article of commerce. Indeed, on

Collecting heads of palm fruits in West Africa.

occasion, over 10,000 tons of the nuts were exported in a single year, while in 1927 Nigeria alone shipped 2,838 tons of shea nut butter. Although it is averred by some that its flavour is inimical to general popularity, this was evidently not the opinion of Mungo Park, who described it as superior to the best butter from cow's milk. In any case, the stearin is employed as a chocolate fat, and applied research should render the untreated product, which is undoubtedly edible, suitable for many dietetic purposes, besides its numerous industrial uses.

Oil Content of the Shea Nut

The amount potentially available is copious, as the trees abound in an extensive belt on the landward side of the adjacent coastal palms; so it becomes a question of turning this natural wealth to good account. While the oil content of the shea nut naturally varies, it averages about 50 per cent. The potential annual supply may conceivably equal that of groundnuts.

Cottonseed oil has hitherto been the major ingredient of commercial edible fat, but the demand for it is continually expanding. This is a good omen for West Africa, for while cotton is not currently of the first importance to its economy, there is room for further development, with a fairly assured external market for the seed, while much of the fibre might be retained for local use.

Favourable Climate

With its tropical climate, West Africa is manifestly congenial to various other genera that have not yet been introduced, though they would presumably thrive with the same profusion as do tobacco and cassava—both of alien origin. Soil may be another problem, but one unlikely to impose an obstacle in every instance.

West Africa's potential resources have yet to receive full recognition, but they cannot be fully utilised until transport and other facilities are provided which are efficient and adequate for the work involved.

Breaking nuts for copra manufacture on a Gold Coast plantation.

Photos from the Imperial Institute Collections, South Kensington.

The Vitamins

Progress in 1948

F. A. ROBINSON, M.Sc.(Tech.), LL.B., F.R.I.C.
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Part I

During the year under review there has been a steady stream of papers relating to vitamin research, comparable in variety and volume with those published in 1947. A smaller proportion of the papers, however, has been devoted to analysis during 1948. These, without exception, have described improvements in well-known analytical methods, which have been either standardised as the result of collaborative work or modified to make them applicable to the estimation of one or other of the vitamins in different types of biological material. Most of the other published papers relate to biological properties of the vitamins, to their availability in different foodstuffs or to the amounts required by different animal species, to their absorption and excretion, or to their probable functions in living organisms.

THE outstanding discovery of 1948 has been the isolation by Dr. E. Lester Smith of Glaxo Laboratories, Ltd., and by a group of workers at Merck and Co., Inc., Rahway, New Jersey, of the anti-pernicious anaemia factor of liver in crystalline form. This has been designated vitamin B_{12} by the Merck workers. Also of considerable interest is the claim that rutin, as well as hesperidin, exhibits vitamin P activity of a high order. Attempts have previously been made to identify vitamin P with various flavanol glycosides, but these have invariably met with serious objections. It has now been established that both hesperidin and rutin have vitamin P activity greatly exceeding that of any other single substance so far discovered, and both substances are now used for the treatment of capillary fragility. An observation that may have consequences of the very greatest importance is the discovery that pteroyl triglutamic acid, a member of the folic acid group of vitamins, appears to have a palliative effect in certain types of malignancy.

Vitamin A

The successful synthesis of vitamin A announced in 1947 has been followed in recent months by the synthesis of related substances possessing vitamin A activity. These include the ethyl ethers of homovitamin A and 5-dehydro-homovitamin A,[1] containing one carbon atom more than vitamin A ether, and the ethyl, isopropyl, and *tert.* butyl ethers of vitamin A itself.[2] Although active, none of these substances is as potent as vitamin A. Crystalline vitamin A methyl ether, on the other hand, is said to be slightly more active, with a potency of 3,500,000 U.S.P. units per g.[3] Pure vitamin A_2, the characteristic vitamin of fresh-water fish liver oils, has been obtained by a complicated procedure involving molecular distillation and chromatography;[4] it has a biological potency of 1,300,000 U.S.P. units per g., or about 40 per cent. of that of crystalline vitamin A.

Complexities of Vitamin A and Carotene

A considerable amount of work has been carried out on the relative biological potencies of vitamin A and carotene; the results show what a complex problem this is. When β-carotene is administered together with α-tocopherol, which is known to protect it from destruction in the gastro-intestinal tract, each molecule is apparently converted into two molecules of vitamin A,[5] retinene (vitamin A aldehyde) probably being formed as an intermediate.[6] The evidence at present available indicates that in the rat, at all events, this conversion takes place in the wall of the small intestine.[7] Such complete conversion occurs only under ideal conditions, however, and a variety of circumstances may interfere with the process. Thus, the carotene in different varieties of carrot is not utilised with equal efficiency and, in general, the higher the carotene content, the lower is the biological value of the carotene present; this is due mainly to destruction or faulty absorption in the intestine.[8] Absorption of vitamin A was improved, both in infants, children, and adults,[9] and in animals,[9, 10] by using an aqueous suspension instead of an oil solution; utilisation may be up to three times as great with the former as with the latter. Xanthophyll, like α-tocopherol, appears to protect both vitamin A and carotene from destruction in the gastro-intestinal tract.[11] Mineral oils, on the other hand, interfere with the absorption of carotene, the continued in-

A field of buckwheat, from whose leaves and flowers rutin may be extracted.

gestion of a mineral oil by men on a normal diet resulting in a decrease in the plasma carotene, although not in the vitamin A level of the blood.[12] This is consistent with the observation that the plasma carotene is more sensitive than the plasma vitamin A to changes in the diet. The vitamin A level of the plasma may in fact be used to measure the utilisation of carotenoids by humans.[13] Although it is more sensitive for this purpose than the dark adaptation test, it is probably more specific.

Other Fat-soluble Vitamins

Additional papers have been published, confirming earlier work, on the value of calciferol in the treatment of cutaneous tuberculosis (lupus vulgaris). Although the mechanism of the effect is still obscure, the vitamin certainly has no direct toxic effect on the tubercle bacillus, but appears to stimulate the formation of young connective tissue,[14] and to make calcium available to lupus tissue.[15] Ertron, the vitamin D preparation obtained by electrical activation of ergosterol, produces extensive subcutaneous calcification, and damages the renal tubules when taken in excessive amounts.[16] The toxic symptoms are in fact similar to those observed with massive doses of calciferol,[17] and there is not yet sufficient evidence to indicate which form of the vitamin is the more toxic.

Little of interest has been published on vitamin E during the year. Its importance for reproduction in the rat is well known, and it has recently been shown that it is essential for the implantation of the fertilised ovum in this species.[18] Its importance in human reproduction is still open to doubt, however, although tocopherol is widely prescribed in cases of threatened abortion, and its value in muscular dystrophy has been seriously challenged, if not yet conclusively disproved.

Experiments on monkeys suggest that in this species vitamin E deficiency gives rise to dystrophy of the skeletal muscles and to the accumulation of pigment in smooth muscle and reticulo - endothelial cells.[19]

There are no new developments to report on vitamin K.

Vitamin C

Several important papers on vitamin C have been published during the year under review. The adverse effect of vitamin C deficiency in wound healing has been confirmed by results obtained with human volunteers. The tensile strength of the healing wound was only half that of a wound in a normal person, and healing was delayed by as much as fourteen days in extreme cases.[20] Closely related to this result may be the observation that both the plasma concentration and the urinary excretion of ascorbic acid are reduced after burns to an extent dependent on the severity of the burn.[21]

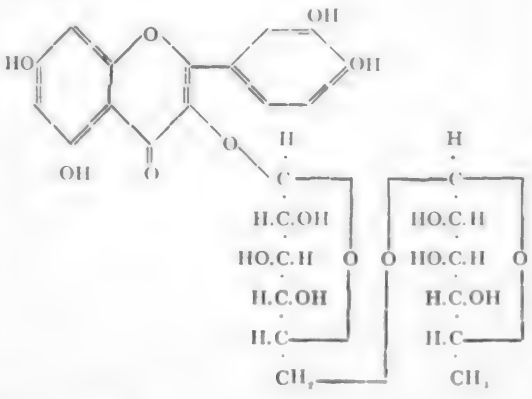
Vitamin C in Infancy

An interesting example of the way in which Nature attends to the needs of the newly born child is provided by other recent work on vitamin C, for it has now been shown that umbilical cord blood and the blood of infants for the first two days of life are markedly richer in ascorbic acid than is the maternal blood.[22] Even the premature infant is born with an adequate store of vitamin C, although the mother may actually be deficient in the vitamin.[23] These results incidentally emphasise the importance of providing an adequate intake of ascorbic acid in expectant mothers. Vitamin C deficient subjects excrete *p*-benzoquinonylacetic acid, a substance which is believed to be an intermediate in the metabolism of tyrosine and phenylalanine,[24] lending support to the view that ascorbic acid is an essential component of the enzyme system required for the complete oxidation of tyrosine. Ascorbic acid is said to afford some protection against poisoning by lead, barium, and bismuth, but not by mercury, or phosphorus.[25] A very important report on the vitamin C requirements of human adults has recently been published by the Medical Research Council.[26] This relates how seven volunteers were maintained free from symptoms of vitamin C deficiency by the administration of 10 mg. per day, in four instances for over a year. When the intake of three of the subjects was reduced to 3 or 4 mg. a day, no definite clinical signs of scurvy appeared, and it was therefore concluded that the "minimal protective dose" of vitamin C is less than 10 mg. per day. The report goes on: "To

satisfy these ill-defined additional needs and to allow a margin of safety it does not therefore seem too generous to treble the minimal protective dose of 10 mg., which prevents clinical scurvy, and thereby confirm the figure of 30 mg. of vitamin C daily recommended by the League of Nations Technical Commission on Nutrition (1938) for the requirement of a normal human adult." Clearly the figure of 75 mg. per day proposed by the U.S. National Research Council is excessive.

No reference has been made in recent years in these reports to vitamin P. For one thing, its status in human nutrition has never been clearly established and for another, several substances have been reported to possess vitamin P activity, and none of these has proved as active as concentrates prepared from such rich sources as black-currant extract. The original work on vitamin P was carried out by Szent-Györgyi on "citrin," but the active constituent was never identified. Later, eriodictin,[27] hesperidin,[27] and catechin,[28] all flavanol glycosides, were found to be active, but no simple method existed of assessing their relative potencies. Subsequently, it was found that a large number of aglycones also possessed vitamin P activity, though of a low order; this was apparently correlated with their ability to protect adrenaline from oxidation, and led to the suggestion that a specific permeability vitamin did not in fact exist.[29] In spite of this, hesperidin came into use for the treatment of capillary fragility, although it had only one-thirtieth of the activity of a very potent black-currant concentrate when assayed clinically.[30] More recently rutin has been successfully used for the same purpose;[31] its activity is similar to that of hesperidin.[30] It occurs in a large variety of plants, but is generally extracted from the leaves and flowers of the buckwheat, *Fagopyrum esculentum*. On hydrolysis, it yields the flavanol, quercetin, and the disaccharide, rutinose, which on further hydrolysis yields glucose and rhamnose.

Its constitutional formula is



In due course more will doubtless be heard on the vexed subject of vitamin P, but on the evidence at present available it would seem as though the term vitamin P covers a group of substances, of which rutin and hesperidin are the most important members.

Aneurin, Riboflavin, and Nicotinic Acid

With the three oldest members of the vitamin B complex, the principal preoccupations during the year under review have been with the requirements of different species of animals and the effects of a deficiency of these substances in animals and man. Newborn infants excreted large amounts of aneurin, riboflavin, and nicotinic acid (and also pantothenic acid and biotin) for the first three days of life, corresponding with the period of rapid weight loss and low vitamin intake.[32] These high excretion levels are believed to be due to the elimination of large reserves stored during intra-uterine life. An attempt to ascertain whether riboflavin deficiency could be correlated with the incidence of toxaemia and other complications of pregnancy gave negative results, nor did a deficiency of this vitamin appear to affect the birth weight or development of the infant.[33] Riboflavin deficiency appeared to be the main factor responsible for a group of syndromes characterised by sensory disorders due to malnutrition,[34] while a multiple vitamin deficiency was the cause of the so-called "pellagrous encephalopathy" which was observed in sixty-three prisoners of war from Singapore.[35] A lack of aneurin was shown to be associated with hunger oedema, but was not an essential feature of this condition.[36] Continuous examination of urine after repeated riboflavin administration is suggested for the diagnosis of riboflavin deficiency.[37] A new test for nicotinic acid deficiency has been proposed,[38] which involves finding, by a standard technique, the amount of nicotinic acid necessary to produce vasodilation. The normal value is about 100 mg., but may be increased 10-fold in hepatic disease and herpes zoster, and 3- or 4-fold in pulmonary tuberculosis.

The leaves and flowers of buckwheat.

The absence of aneurin from the diet of the rat led to a diminution in the protein content of the animals,[39] while chicks required more aneurin to prevent polyneuritis when reared at tropical temperatures than under cool conditions; the requirements of other members of the vitamin B complex were not affected.[40] The riboflavin requirements of chicks and the amounts stored in different tissues have been determined.[41] The calf has been shown to require aneurin either in the diet or synthesised in the rumen, pathological symptoms developing on a diet low in the vitamin; these were accompanied by reduced aneurin excretion and increased blood and urinary pyruvate levels.[42]

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(*To be continued*)

Chemical Analysis

At an ordinary meeting of the Society of Public Analysts and other analytical chemists held on November 3 under the chairmanship of the President, Mr. Lewis Eynon, three papers were presented and discussed.

The adaptation of the Wijs procedure for determining unsaturation in oils and organic compounds to small quantities of material was announced in a paper by Miss W. M. Phillips and W. C. Wake entitled "A Micro Method for the Determination of Unsaturation." The precision of the technique was tested by using cyclohexene, which had been purified and freed from peroxide, as the standard substance. The results shown by castor and blown linseed oils were compared with those given by the usual full-scale method. By using carbon tetrachloride as the solvent, it was possible to determine and allow for any halogen consumed in substitution reactions.

A specially designed "iodine flask" was used to prevent losses of halogen during manipulation and titration.

In his paper on "The Determination of Small Amounts of Hydroquinone in Styrene," S. M. A. Whettem stated that a colorimetric method has been devised for determining hydroquinone, a stabiliser that prevents polymerisation of certain liquid monomers. This makes use of the Folin-Denis phosphotungstate reagent, which is applied in alkaline solution, after extraction of the hydroquinone with water. The method was shown to be sensitive to 10 parts per million of hydroquinone in styrene. A rapid tintometric method for process control was described.

According to B. Bagshawe and E. Dyke, in their paper "A Method of Determining the Tin Content of Tungsten High-Speed Tool Steel," the difficulties that occur in removing ions that interfere with the volumetric determination of tin from solutions of alloy steels have been overcome by separating tungsten as carbide and by precipitating the tin as stannic sulphide in presence of molybdenum, which acts as a "carrier" for small quantities. The method for the evaluation of the tin, after its purification, made use of reduction with metallic aluminium in presence of a dissolved antimony salt, followed by titration with standard iodate and starch indicator.

Food for Britain from Auckland

An important new food packing plant erected by Butland Industries has recently been put into operation at Penrose, an industrial suburb six miles from Auckland, New Zealand. Situated in ideal surroundings, the Auckland plant is playing an important part in the present Dominion-wide "Food for Britain" campaign.

THE growth of Butland Industries is an example of versatility and adaptability in overcoming unusual difficulties and coping with the strain of war-time production. Comprising a number of food producing and packaging industries, including such commodities as tea and coffee, fruit cake mixture and preserved fruits, tomato juice, apple juice, pork and beans, spaghetti and tomato, and finally "Chesdale" cheese, the company also packs food products for the C. and E. Morton Group and bottles Lea and Perrin's sauce—an example of running efficient units for small markets.

Two export packs, essentially New Zealand in origin, are process cheese and canned foods.

Process Cheese

Process cheese is an age-old milk product brought up to date. To preserve cheese when it has attained its best condition, in a form suitable for delivery at any time or place, is the aim of the maker of process cheese. While retaining the delicate flavour of mild cheddar cheese, "Chesdale," made by Butland's, has a better texture and safeguards the freshness and cleanliness that are at times lacking in bulk cheese handled over the counter or kept for any length of time in the house.

The raw material or "green" cheese is supplied by selected dairy companies in the Waikato district, and is chosen for its consistent flavour, only "Finest" and "First-Grade" cheese being used. On arrival at the factory the cheese is put into coolers where it is kept at a temperature favourable to even ripening and ageing. On maturity, the cheese of different ages is brought out to the factory and subjected to a carefully regulated process to give the Chesdale flavours which, during the last war, achieved world-wide reputation.

In the examination rooms the cheese cloth and outer rind are removed by hand. At this point the cheese undergoes its first laboratory tests for moisture and fat. Three to four cheeses of varying maturity are mixed to make Chesdale blend. Cut into bars, the cheese is then finely grated when it is ready for processing.

Purposes of Processing

The processing operation has a twofold purpose —emulsification and pasteurisation of the cheese. Normally, on heating, the butterfat of cheese will separate from the rest of the solids from which the moisture can readily evaporate. To prevent this loss of moisture the addition of an emulsifier is necessary. Pasteurisation arrests the action of micro-organisms which would be responsible for the further ageing of cheese and also the production of off-flavours.

This twofold aim is achieved by mixing the cheese, emulsifying agent, and a little colour in a

Crates of raw cheddar cheese arrive at Penrose for inspection and processing.

In the examination room the cheese cloths and outer rinds are removed by hand.

steam-heated kettle, and stirring until the mass has reached the desired pasteurising temperature. From here it is rapidly passed to a mechanical filler which packs the cheese into the familiar ½ lb. packet. The machine consists of a circular table with twelve pockets in which the tinfoil wrapper is formed, then filled automatically with the correct weight of cheese, finally lidded, then pushed to the surface of the table to be put into a packet by a girl. The final article is sampled and tested, the bulk being collected into a blue display carton, and then stored until distribution.

Among the activities of the canning plant of the Penrose factory are the processing of tomato and other juices, beans and tomato, and spaghetti and tomato. Tomatoes for this purpose come in from contract growers, each of whom receives from the laboratory a daily report on the quality of each load covering colour, taste, and texture.

The tomatoes pass through seven stages for juicing, the first of which is the washing operation. Following this, they are conveyed to sorting tables for examination, the selected tomatoes being conveyed to the chopper pump where they are disintegrated and pumped to the preheating unit, where the fruit is removed from contact with the air and preheated to 180° F. which inactivates the enzyme but does not destroy the vitamin. At the next stage the skins and seeds are removed, leaving the pure juice ready for pasteurisation. After process-

The cheese, emulsifying agent, and a little colour are mixed in a steam-heated kettle and stirred until the mass has reached the desired pasteurising temperature.

ing, the juice is filled into cans by an automatic bottom filler, the purpose of which is to prevent aeration and thus preserve vitamin C, and passed to the labeller and packer.

Tomatoes are also pulped for use in the off-season as sauce for beans and spaghetti. The sauce for this is prepared from the firm's own pulp with other ingredients and boiled in stainless steel tanks. The pulp is then screened in a finisher which has been made in New Zealand to Butland's own specifications.

Treatment of Beans

Beans are soaked, cooked in steam-jacketed pans, and sorted by hand. Beans and sauce are then filled simultaneously into cans, conveyed to the double seamers, along a conveyor to the retorts for final cooking and sterilising, and lastly to the labelling and packing machine.

As in the case of process cheese and tomato juice, strict laboratory control is maintained. In bean processing all raw materials are examined and tested for fat and water content. There is a daily check of temperature control in addition to a final check of the finished product for water, fat, protein, ash, acidity, and *p*H value.

A similar process is followed for the canning of spaghetti which is made from New Zealand-grown wheat.

The war effort of the makers of "Chesdale" was notable for the enormous tonnage produced in relation to the size of the plant and the immense difficulties under which it was produced.

Huge quantities were supplied to the United States Forces stationed in New Zealand and in the Pacific, and to Allied Forces in India, Burma, and Europe.

It is a tribute to the high purpose of Butland's that they never faltered in those demands, even when it meant sacrificing the local market.

Above: **After processing, the cheese is rapidly conveyed to a mechanical filler.**

Left: **Section of the Crest canning plant.**

Below: **Automatic filling and wrapping machinery.**

Industrial Quality Control

Of American origin, this book* is handicapped for general use by its constant background of the engineering industry. This, indeed, is a failing of many industrial books. Are we to believe that only those factories which are built around machine-tools are sufficiently well organised to be discussed? The absurdity of such an assumption is obvious, but modern industrial literature tends to suggest it. However. the title of this book clearly indicates a general treatment, and this must be criticised as misleading. Any reader whose special factory interest lies outside the engineering-cum-fabrication sphere will have to do all the work of adaptation himself. This limitation could have been avoided had the examples and details been chosen more widely.

The book is presented in two sections. The first deals with quality control as a proposition—its functions, responsibilities, costs, and relationships with other departments, etc. The second and larger section presents the more detailed story of modern statistical methods.

The first section, like so much of the literature about modern organisation, is needlessly wordy. Long paragraphs provide simple facts and arguments that require only quite brief sentences; on one page a three-part diagram is used to present the elementary information that a quality control department can be made responsible to one of three other departments of a business. If any reader is so dull-witted that he needs all this help, he is unlikely to open this kind of book at all. To illustrate the type of writing here is an extract:

> Up to this point the discussion has been philosophical. Either too much or too little control is uneconomical and undesirable. An optimum point exists. We cannot expect to determine it precisely, but any approach that gives us approximation is valuable.

The drawn-out statement of the obvious, whether in philosophical or more practical terms or in both, is not simplicity; it is over-elaboration, and it makes the reader feel that a simple subject is actually difficult. The first part of this book should have been disposed of in half the space the author has used.

The statistical section is much the longer and it contains the real meat. In a recent article in *Discovery*, Prof. C. D. Darlington said:

> The theory of sampling is the most important development of scientific method in this century. Its foundations were laid by R. A. Fisher in this country twenty years ago. It is taught in secondary schools in our own dominions . . . but it is unknown to most professors of science in English universities.

* *Quality Control in Industry. Methods and Systems.* By John G. Rutherford. Pp. 201+xvii, 70 illustrations, 22 tables. London. Price 20s. net.

In this book the statistical approach to sampling is explained in considerable detail, first in basic principles and then from the viewpoint of industrial application. The author has not succeeded in making it an easy subject for the non-mathematically minded, but this is not a criticism; some mathematical aptitude is required. He has certainly done as well as anybody has the right to expect and he has covered a long stretch of ground.

Statistically Based Sampling Methods

Just how far statistically based methods of sampling could be applied to the food industry it is difficult to judge. Much of the sampling for variations is done for the purpose of legal requirements, the determination of contents of undesirable traces. In such cases a statistical approach, though resting upon a sound scientific basis, would not be legally admissible, for the Law (like the professors) will not have heard of R. A. Fisher. But where positive rather than negative qualities are being determined, and where a food product is being batch-produced, these modern methods might well be of great value. Certainly in the chemical industry in the sampling of raw or semi-refined materials they are being increasingly employed. Even from the legal angle, where permissible limits of tolerance are being laid down, a statistical approach should logically accompany medical or other approaches. The pity of this book is that the author has not broadened his survey to include these other possibilities of application.—D. P. H.

Cork Substitute for Closures

New types of substitutes for cork, using glycerine as a plasticiser, suitable for making container closures, are described in a recent U.S. Patent. In an illustrative example, 97 parts of hide glue were stirred into 123 parts of water, and the mixture was maintained at 54° C. for ten minutes with stirring. Then 12 parts of nitric acid (sp. gr. 1·4) were slowly added. After further warming and stirring, 48 parts of glycerine and 97 parts of mineral filler were added while at a temperature of 48° C. Finally, 90·2 parts of a 40 per cent. aqueous solution of hexamethylenetetramine were added. The mixture was beaten for ten to fifteen minutes. The dispersion was then cast into the shape of container closures of the pressed-on type, and the shapes finally cured in a series of three ovens maintained at 88°, 110°, and 63° respectively, for a total time of forty-five minutes. The final products, it is claimed, have characteristics, such as bulky density and degree of resiliency, closely akin to those possessed by cork.

Fermentation in Concentrated Orange Juice

Part II

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CONTAMINATION by washings can be detected in another way. Examination of the total solids concentration of the contents of the first few bottles to be filled on a "clean" machine has usually revealed appreciable dilution; in one case a fall from 65° Br. to 55° Br. was recorded, indicating the addition of about 1 part of water to 4 of juice. The effects of contamination with osmophilic yeasts can also sometimes be detected in the behaviour of the bottles later. Table V relates to a batch of juice in which a greater proportion of bottles from the beginning of the batch fermented than from the end; behaviour which suggests very strongly that the machine carried a small infection of osmophilic yeasts, which was gradually worked out as a large bulk of nearly sterile juice flowed through.

TABLE V

THE PROPORTION OF FERMENTING BOTTLES, RELATED TO THE PROGRESS OF A BATCH OF JUICE THROUGH THE BOTTLING MACHINE.

Order of Bottling.	*Number Fermenting.*	*Number Sound.*
1-100	91	9
101-200	96	4
201-300	94	6
301-400	96	4
401-500	96	4
501-600	75	25
601-700	43	57
701-800	15	85
801-900	12	88
901-1,000	13	87

A further complication may arise from the way in which many of these machines work. The juice is sucked into the bottles by a vacuum, applied at the side of the filling nozzle, and because of the likelihood that surplus juice will find its way down the vacuum line, a trap reservoir is inserted to catch it (Fig. 6). The proportion of juice which finds its way into this reservoir may be high, approaching several per cent. on a badly operated machine, and there is therefore a great temptation to return it to the main filling reservoir to avoid waste—indeed, some machines are designed so that this must happen* (*e.g.* Fig. 6). Unfortunately, the vacuum line is usually made very narrow (to avoid sucking over excessive quantities of juice if a bottle is overfilled), so that it is, of all parts of the machine, the most difficult to clean and the most likely to be contaminated. The result of returning juice from the trap may thus be that infection from the vacuum line eventually finds its way into the bulk of the juice, with gradually rising infection throughout the batch (Table VI).

The ultimate reason for these difficulties is, of course, that such machines are so complex that they demand considerable *savoir-faire* on the part of the cleaner. Two simple examples may be given of the kind of thing which happens: (i) One machine had a right-angle bend just above the level-regulating valve of the juice reservoir, consisting of a T-piece with one arm dead, which formed a complete *cul-de-sac* retaining partly diluted juice not swept out during washing; (ii) in one case the sealing washer (closing the neck of the bottle while vacuum is applied—*cf.* Fig. 6) was made of sponge rubber, and although this had been washed with hot water, it still held in its pores partly diluted juice containing roughly 10^6 yeasts/ml., and was in such a position as to offer the greatest chance of infecting every bottle.

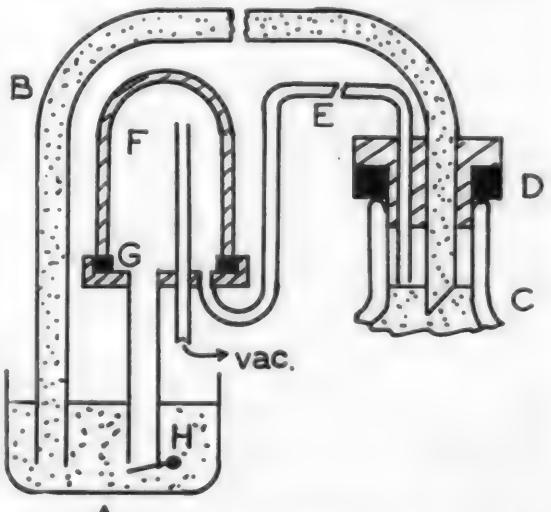


Fig. 6.—Diagrammatic representation (scale distorted) of the filling and vacuum lines on a bottling machine.

* It may be mentioned in passing that this is simply a special case of the practice of returning salvaged juice for re-use: always very dangerous, since any infection present in it is thereby perpetuated at compound interest.

TABLE VI

THE EFFECT OF RETURNING TO THE MAIN RESERVOIR JUICE WHICH HAS BEEN CONTAMINATED BY PASSAGE THROUGH AN UNCLEAN VACUUM LINE.

Sample.	Machine 1.		Machine 2.	
	Time.	*Yeasts/ml.*	*Time.*	*Yeasts/ml.*
Mix in bottling machine reservoirs	12·25	35	15·25	22
	13·05	45	17·00	86
	16·30	250	18·15	122
Vacuum-line trap	14·35	103	16·05	550
Nozzle sealing washer (sponge rubber) ..	—	—	14·00	10^4

Emphatically, washing of such apparatus is not enough. In some factories a gallant attempt is made to sterilise apparatus with steam, but it is not generally realised how difficult this is. The yeasts are mostly in contact with a large bulk of metal, and unless this is raised to a temperature where it is too hot to touch (60° C.) for several minutes, it is unlikely that the yeasts will be killed. By way of example, it may be mentioned that the machines of factory A in Table IV were dismantled, washed, and steamed with obvious commendable thoroughness, yet it is clear that they were far from being sterilised.

Final Hypochlorite Wash

The only real solution is to finish off the washing with a disinfectant. This has been demonstrated by taking a normally washed machine and bottling on it a little sterile sugar syrup, followed without break by near-sterile juice, then dismantling the machine and washing as before but with the addition of a final wash in hypochlorite. The results are shown in Plate 2; the machine contributed substantial infection when washed normally, but not after treatment with hypochlorite.

In the light of the observations above, it is not difficult to see how the outbreaks of fermentation might arise.

Magnitude of Infections

The fermentation is caused by osmophilic yeasts. These are often found, sometimes in large numbers, in the canned juice, and to a lesser extent on the outside of the cans. Similar yeasts may be found in various parts of the equipment handling the juice, especially when badly cleaned; from the resemblance to yeasts in canned juice it is probable that the original source of these infections was contaminated juice, but this remains to be definitely proved by detailed comparison of the types isolated.

Infection up to a level of more than 10^6 yeasts/ml. is necessary before a can is unmistakably blown and can be rejected out of hand. Levels of infection below 10^6/ml. can only be detected by the bacteriological test carried out as part of the Ministry examination, but it is unfortunately quite impossible to examine all imported cans in this way. The number runs into several million annually, so that for normal examinations it is possible to test only about 1 can per 1,000; although, of course, where necessary (*e.g.* with brands known to be unreliable) this level of sampling may be increased. Nevertheless, from Table I it will be evident that no practicable procedure of this kind could ensure with certainty that no badly infected cans pass undetected.

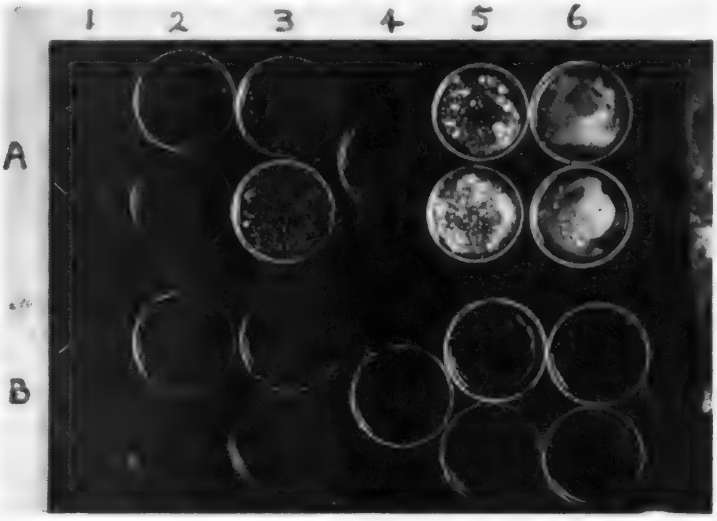


Plate 2.—Sterilisation of bottling machine. Series A—machine washed and steamed normally. Series B—as A but finished with hypochlorite. No. 1, sterile syrup before bottling. No. 2, first bottles. No. 3, last bottles. No. 4, sterile juice before bottling. No. 5, first bottles. No. 6, last bottles.

Since each can holds roughly 4 litres of concentrate, a can on the point of blowing, but apparently sound, could provide a single yeast for each of some 4×10^9 bottles. Our experiments have shown that, in the absence of preservative, a single yeast in a bottle may cause the concentrate to ferment (*cf.* Table III); there is then no difficulty in imagining whence the infection might come—indeed, the wonder is that any bottle might escape it.

A partial reason for this lies in the fact that the evil effects of an

infected can are limited to the batch of juice in which it is included. The incidence of infection thus depends on the size of the production unit for mixing, as a moment's consideration will show. For the sake of argument, we may assume that on an average 1 can in 300 is seriously infected to the extent of 10^5 yeasts/ml. (a figure at one time perhaps not far from the average in fact). If a manufacturer mixes cans together in batches of 100, on average only one-third of his batches will be appreciably infected; if, however, he mixes the cans 1,000 at a time, practically all batches will be infected. General experience points to the importance of this principle: on the whole, the larger bottlers have been more persistently troubled by fermentation, despite their generally better techniques (Table VII).

TABLE VII

INCREASED INCIDENCE OF FERMENTATION WITH LARGE PRODUCTION UNITS.

Size of Production Unit (Gal.).	*Bottler.*	*Bottles Reported Fermented, as Percentage of those Filled.*		
		1946.	*1947.*	*Group Av.*
100-1,000	1	0·3	0·3	
	2	1·0	0·4	
	3	0·6	0·1	
	4	0·6	0·4	
	5	1·8	0	0·56
100	1	0	0·01	
	2	0·2	0·02	
	3	0·3	0·09	
	4	0·3	0·3	
	5	0·3	0·05	0·16

There is, however, another side to this picture; an infected can produces a proportionately greater infection in a small batch than in a large one. A can containing 10^5 yeasts/ml. would, in the example quoted, give rise to an infection of 10^2 yeasts/ml. in the 1,000 gal. batches, and 10^3/ml. in the infected one of the trio of 100 gal. batches. In the absence of preservative, both large and small lots of infected juice are alike liable to ferment, since differences in magnitude of infection at this level do not make much difference. This is, however, not the case when preservative is present, as will be seen shortly.

Infection during Bottling

Before turning to the consideration of preservative, we have to take account of extra infection contributed during bottling. In the nature of things, no precise figure can be given, since it varies greatly from one bottler to another; moreover, even with a given plant, the proportion of dangerous osmophiles is very inconstant. We may, however, reasonably take the figures of Table IV, since they refer to normal conditions, which indicate a contribution of the order of 10^2 osmophiles/ml. from bottling machines. Infections from syrup have been of the same order or less. Infections from other sources are usually much smaller in quantity.

It would appear, then, that the contribution from the juice and from its handling are of roughly equal importance. With unreliable juice handled imperfectly, there may be infections in the bottled product of the order of 10^2/ml. With nearly sterile juice, handled in sterilised equipment, the level of infection can be kept at a level of 1-10/ml. What is the significance of this difference in relation to fermentation?

Control of Fermentation

If it were possible to prevent the yeasts from entering the juice, or if it were possible to ship, pack, bottle, distribute, and store the juice at home, at temperatures around 40° F., fermentation would not then occur. Since neither of these things can be done, it will be obvious that some preservative is essential. All the bottled juice is practically certain to be infected, more or less, with osmophilic yeasts, and as we have shown, the least infection may give rise to fermentation if no preservative is present. In this case, the nature and quantity of the preservative are specified:* one is permitted to add not more than 350 p.p.m. (w/w) of SO_2, or 600 p.p.m. benzoic acid. The problem thus resolves itself into the question, what is the greatest level of infection which this amount of preservative will suppress? Investigation of this point has been confined to SO_2, which is now the preservative most generally used.

It is a general rule that the greater the level of infection the greater the quantity of preservative needed to overcome it, but in the practical case no precise answer to the question is possible. General experience and a variety of experiments, some of which are summarised in Table VIII, have indicated that, with 350 p.p.m. SO_2 added during bottling to these concentrated juices, fermentation is unlikely to ensue with 10 yeasts/ml., with 100/ml. it may occur, and with 1,000/ml. it occurs frequently. Very roughly, therefore, 100 yeasts/ml. may be suggested as the critical level of infection.

It is noteworthy that, according to our estimates, the levels of infection actually occurring in practice probably fall below or above this critical level, according as the juice is prepared and bottled carefully or otherwise. With good conditions in both respects, it is not difficult to keep the volume of infection at "safe" levels near 10/ml.

It must be realised, however, that this will not absolutely guarantee immunity from fermentation, since even with such low levels of infection it may occur very rarely. This is because SO_2 sometimes loses its preserving power. The reasons for this lie in a complex of relations between the preservative,

* The Public Health (Preservatives, etc., in Food) Regulations.

TABLE VIII

A Rough Indication of the Relation between Level of Infection and Incidence of Fermentation. (Orange Juice 65° Br. 350 p.p.m. SO_2 in Air-tight Bottles.)

Level of Infection. (Osmophilic Yeasts/ml.)	*Temp. (° C.)*	*Bottles Fermenting/ Bottles Tested.*	*Approx. Per Cent. Fermentation.*
10^4	37°	0/10	
	5°	10/10	50
10^3	−1°	0/10	
	20°-30°	0/15	
	10^3	11/50	10
10^2	20°-30°	1/16	
	25°	631/1,000	
	,,	0/1,000	25
10	20°-30°	0/20	
	25°	20/1,000	
	,,	4/1,000	
	,,	0/1,000	1
1	25°	4/1,000	
		0/1,000	0·1

the yeasts, and the juice itself, which are too involved to be discussed here. An important factor is the nature of the concentrated juice, which is outside the control of the bottler.* From the practical point of view the salient fact is that fermentation can be reduced to negligible levels only by careful handling all along the line. Persistent fermentation is a sure sign of poor practice, either in the manufacture, canning, or bottling of the juice.

Summary

Serious fermentation in Welfare bottled orange juice has been caused only by a special group of osmophilic yeasts. These may be found in the canned juice used as raw material, which infects the bottling equipment when this is not sterilised regularly. In bad conditions, infections of some 10^2 yeasts/ml. have occurred; with good practice this can be reduced to 1-10/ml.

The fermentation is only rapid at warm temperatures. It could be prevented if distribution and storage at 40° F. were possible. Since it is not possible, 350 p.p.m. SO_2 (the legal maximum) are used as preservative. As a rule, this is effective against low levels of infection, but not against 10^2/ml. or more. The exact efficacy of the SO_2 depends partly on the nature of the juice, and thus cannot be defined precisely, but with good quality canned juice, bottled in near-sterile plant, fermentation becomes negligible.

* Ingram, M. "The behaviour of SO_2 in concentrated orange juice." *Food Research* (in press).

ACKNOWLEDGMENT

The work described in this paper was carried out as part of the programme of the Food Investigation Organisation of the Department of Scientific and Industrial Research. The author is indebted to Fruit Products Division, Ministry of Food, for permission to utilise confidential statistics. Mrs. O. M. Porter assisted in the experiments. We are particularly grateful for the co-operation of the staffs of various bottling firms, without which the investigation would have been impossible.

CORRESPONDENCE

Pressure Cooking

TO THE EDITOR OF FOOD MANUFACTURE

Dear Sir,—We were interested to read in Food Manufacture of January 1 the informative article headed "The Nigger in the Pressure Cooker."

One of our clients, who are large-scale producers of pressure cookers in this country, appreciate the service rendered to actual and potential users of pressure cookers by your publication of the lucid commentary by Professor Yudkin on the nutritional aspect of pressure cooking. Nevertheless, they feel that the writer is wrong in his assessment of the conservativeness of the cook, and particularly in his statement that "wild horses would not induce the typical occupant of the present-day kitchen to use what she terms 'contraptions,' or to clock-watch her operations—fuel or no fuel."

Here are a few facts which refute this assumption:

Production: Now estimated to be well over 10,000 a week for all British factories.

Home Sales: Rapidly mounting, especially during and since the Christmas demand. A single London store sold 20,000 last year.

Export: In proportion to home sales. Every country, every population (white and coloured) is demanding them.

Education: The Ministry is instituting refresher courses in pressure cookery in eleven domestic training college centres.

Yours faithfully,

Editorial Services, Limited.

London.

Editor's Note.—It is interesting to note the increasing popularity of pressure cooking and the breaking down of the reactionary attitude of the *genus* cook.

BOOKS RECEIVED

Orders for any of the books listed below or reviewed in this issue may be placed with the Books Department, Food Manufacture, 17, Stratford Place, London, W.1. It is regretted that under present conditions it is not always possible to supply books by return of post.

The Cook's Paradise. Being William Verral's *Complete System of Cookery.* Pp. 139. London. Price 7s. 6d. net.

Five to a Feast. By T. A. Layton. Pp. 219. London. Price 12s. 6d. net.

Food and Other Frailties. By Romilly Fedden. Pp. 142. London. Price 15s. net.

The Soft Drinks Trade Manual. Edited by Kenneth Penn. Pp. 127+x. London. Price 21s. net.

The Groundnut and its Treatment

Part II

In continuation of the first part of this article published in the February issue of FOOD MANUFACTURE, this last instalment deals with continuous methods of refining groundnut oil and its subsequent bleaching, deodorisation, and hydrogenisation.

THE refining of groundnut oil is carried out by means of alkali treatment, which not only frees the oil of the fatty acids which exist in it in free form, but also removes a certain amount of other non-oil substances, including phosphatides and various resinous and mucilaginous materials. These substances may be removed by their actual combination with the alkali by hydration, or by adsorption or occlusion.

Caustic soda in a 12° Bé. to 20° Bé. solution is almost invariably used as the refining agent, with an excess of 0·10 per cent. to 0·25 per cent. caustic soda (as dry sodium hydroxide, on the basis of the weight of oil) above the amount required for combination with the free fatty acids. The refining operation involves the following successive steps: (*a*) Intimate mixing of the cold oil and the caustic solution to form an emulsion in which the immiscible oil and water phases may interact; (*b*) application of heat to break the emulsion; and (*c*) separation of the oil and aqueous phases by settling or other means.

Alkali refining will not render an oil completely neutral, but will reduce its free fatty acid content to a negligible degree, *i.e.* 0·01 per cent. to 0·03 per cent. There is a considerable loss of neutral oil in alkali refining amounting in different oils to from three to ten times the weight of the free fatty acids.

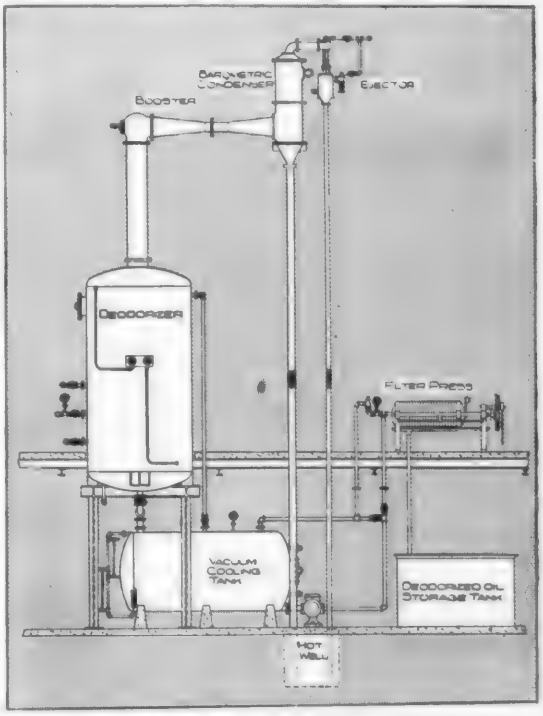
Equipment for Batch Refining

The equipment required for batch refining is comparatively simple, consisting of a cylindrical tank or kettle equipped with a two-speed agitator, a cone bottom, and steam-heating coils or jacket. The charge of oil at ordinary atmospheric temperature is placed in the kettle, the required amount of caustic soda added, and the batch strongly agitated for a period varying from fifteen minutes to one hour. The agitation is then reduced, and the batch heated to about 140° F. to 150° F., and held at this temperature until the emulsion "breaks" and the soap stock separates from the clear oil in the form of small flocculated particles. This operation usually requires from ten to thirty minutes. Agitation is then stopped, and the soap stock, or "foots," is allowed to settle into the cone bottom of the kettle.

In Europe, the oil is heated to 150° F. to 170° F. before the alkali is added and, after reaction is complete, hot water and sometimes dry salt are cautiously added to assist in settling the soap stock and to form with it a liquid layer, which may finally be drawn off from the bottom of the tank. This method leaves a certain amount of soap solution suspended in the oil, which must be removed by a further stage or stages of water washing.

Continuous Refining

The batch refining method has recently given way to some extent to continuous systems, which effect the separation of the oil and soap stock by means of centrifugal action, reducing the actual processing time from a matter of hours to a few minutes. Continuous streams of oil and caustic soda solution are fed through proportioning devices, thoroughly mixed, and passed first through a heat exchanger heated by hot water and then through a battery of primary centrifuges, which continuously



A high vacuum deodorising plant.

discharge soap stock on one side and oil, mixed with a small quantity of soap solution, on the other. The oil is freed of its content of residual soap by mixing it with hot water and passing the mixture through additional batteries of secondary centrifuges. The washed oil is finally dried in a continuous flash drier operating under vacuum.

Certain impurities in the crude oils are flocculated by alkali treatment and removed as a result of hydration rather than actual combination with alkali. For the removal of such impurities, crude oils are sometimes given a preliminary "water washing" treatment in the centrifugal equipment prior to alkali refining or, in some cases, a weak solution of sodium carbonate, trisodium phosphate, or other alkali is substituted for the caustic soda solution.

Where the object in refining is merely the removal of free fatty acids, this may be accomplished by steam distillation of the relatively volatile fatty acids from the relatively non-volatile oil. Steam refining involves blowing the oil with steam under a vacuum at an elevated temperature (450° F. to 475° F.), and is similar in principle and operation to steam deodorisation, described later. An initial steam refining is often employed to reduce the free fatty acid content of the oil to 0·1 per cent. to 0·5 per cent., after which the product is finished by alkali refining.

Bleaching

Refining processes leave some oils—including groundnut oil—quite darkly coloured from the presence of oil-soluble pigments which are not readily removed by any chemical means, and these must be reduced by treating the oil with surface-active solids which have the power of absorbing the pigments. Fuller's earth or bleaching clay is employed, either alone or in combination with a small amount of activated carbon.

Bleaching is usually carried out in an open tank equipped with a high- or medium-speed agitator and heating coils or jacket. The oil is heated to 220° F. to 240° F., and the bleaching clay thoroughly mixed in. The mixture is then pumped through a filter press, the filtered oil being returned to the tank until its colour has reached a minimum value, when it is diverted to another tank. Contact of the oil with the atmosphere at high temperatures may adversely affect its keeping quality, and for this reason bleaching is sometimes carried out in closed tanks under vacuum; a continuous vacuum bleaching system has also been devised, which avoids all exposure to the air until after the oil has been cooled.

Deodorisation

Refined groundnut oil has a characteristic odour and flavour which render it unsuitable for food manufacture without prior treatment. Deodorisation is carried out by vacuum steam distillation; at the high temperatures involved, the odoriferous compounds of the oil become sufficiently volatile to be stripped out, by a current of steam, from the relatively non-volatile oil. By reducing the pressure during operation, the amount of steam required is reduced, and the oil protected from undue hydrolysis by the steam or oxidation by the air. Deodorisation also destroys any peroxides in the oil and removes volatile products of rancidity and any uncombined fatty acids remaining.

Deodorising Processes

Deodorisation is usually carried out in closed, vertical, cylindrical steel vessels, with cone or dish-shaped bottoms, with a capacity of from 15,000 lb. to 30,000 lb. Vacuum is usually supplied by a multi-stage steam ejector system, with an absolute pressure on the vessel of not more than 6 mm. of mercury. The batch of oil is pumped into the deodoriser and the vacuum formed. Heat is then placed on the heating coils by degrees up to a normal level depending on the vacuum; the proper steam flow for a 20,000 lb. batch under 6 mm. pressure is about 300 lb. per hour. The batch is then raised as quickly as possible to the operating temperature, and steaming continued for long enough to complete deodorisation. The normal operating temperature is between 425° F. and 475° F., and the time necessary for deodorisation will vary between one and three hours, according to the temperature and the constitution of the oil. After deodorisation is complete, the oil is pumped out through a water-cooled heat-exchanger or allowed to cool within the deodoriser; it must be excluded from contact with the air until it has dropped to 120° F. to 140° F.

Continuous steam refining has been practised for some time, and a continuous deodorisation process has recently been introduced. In this, the heated oil flows downwards through a tower fitted with trays and bubble caps counter-current to the stripping steam. The hot oil issuing from the tower is used to preheat the feed oil.

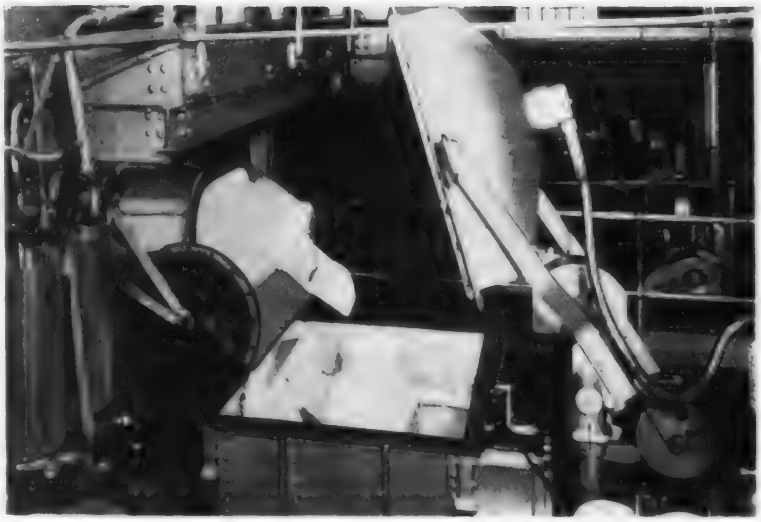
Hydrogenation Processes

Refined groundnut oil can be used as a food without further treatment, either for frying or as a salad dressing. The great bulk of oil produced, however, is used in the manufacture of margarine and shortening, and for this purpose must undergo hardening treatment to secure the desired texture and consistency. By means of hydrogenation, any desired degree of plasticity may be obtained, by hardening a portion of the oil, and it would be technically possible to make a margarine exclusively from groundnuts. Considerations of taste and economy, however, prevent this in practice, and all margarine and shortenings are made from a mixture of oils from a wide range of sources.

Groundnuts are an important source of oil for this purpose, but they are by no means the only one.

The hydrogenation process is complicated, and the fundamental basis of the reaction is not altogether fully understood. Gaseous hydrogen and liquid oil are brought together at a suitable temperature in the presence of a catalyst, but the rate at which hydrogenation will take place depends on a number of factors, including temperature, pressure, catalyst concentration, and the composition of the oil.

Hydrogenation is usually carried out by the batch process. The equipment used is relatively simple, consisting of a closed, vertical, cylindrical steel vessel capable of standing moderate pressure and equipped with an agitator and closed heating and cooling coils.



A stage in the production of margarine, for which groundnut oil is frequently used. *Photo courtesy Lever Bros. and Unilever, Ltd.*

Hydrogenators usually have a capacity of from 10,000 lb. to 25,000 lb. of oil, and are commonly operated at a gauge pressure of from 5 lb. to 60 lb. per sq. in., and at a temperature between 150° F. and 400° F. The amount of catalyst used may be as little as 0·01 per cent. (in terms of nickel, on the basis of the weight of the oil), but the usual amount is between 0·05 per cent. and 0·10 per cent., varying with the characteristics desired in the product.

In a typical case—the preparation of an all-hydrogenated shortening — the hydrogenator is charged with refined and bleached oil and 0·08 per cent. nickel. The charge is heated under a vacuum, with stirring, to a temperature of 170° F., and then placed under a hydrogen pressure of 50 lb. gauge. Hydrogenation is continued under these conditions until the iodine value of the oil is reduced to about 75. The hydrogenation is then interrupted by releasing the pressure in the hydrogenator and placing the charge under vacuum until its temperature has been raised to 260° F. The charge is again placed under a hydrogen pressure of 50 lb., and hydrogenation continued until its iodine value is about 62, or until analysis of the oil by a quick penetration technique shows its consistency to be at the desired value. Hydrogenation is then halted by placing the charge under vacuum again while it is cooled to 160° F. The vacuum is then released, and the charge pumped through a filter press to remove the catalyst. The total hydrogenation time will be about two to four hours.

Obtaining Proper Plasticity

An essential feature of lard, shortening, margarine, and similar products is their plasticity. In order to ensure the proper plastic properties, the foods must be chilled rapidly as they are solidified. In Britain this is normally carried out by means of a chill roll, which consists of a large, slowly revolving, horizontal steel cylinder, refrigerated internally by means of brine or the direct expansion of a refrigerant. The cold roll picks up an external coating of liquid fat at 100° F. to 130° F. from contact with a trough filled with the material. After the fat has been in contact with the roll for slightly less than one revolution, it is removed by a scraper blade and deposited in an open trough equipped with a screw conveyor. If air is to be emulsified with the finished product, a portion of the conveyor shaft is fitted with blades which whip air into the solidified fat. From the trough, the margarine is conveyed to blenders, while shortening and lard go through homogenisers of various alternative types. The product is then finished and goes to packaging machines.

American Methods

In America, the roll system of solidification has been supplanted to a considerable extent by the closed or votator system, in which the chilling operation is carried out inside a small refrigerated cylinder equipped with sharp, fast-revolving blades. The shaft carrying these blades is relatively large in diameter, so that the flow of fat is through a narrow annular space, close to the refrigerated cylinder walls. From the refrigerated cylinder, the fat is passed to an auxiliary cylinder, unrefrigerated, but equipped with stirrer blades, where crystallisation is completed. The votator system is claimed to have considerable technical advantages over the roll system, but these are denied by British manufacturers.

Industrial Uses

As has been stressed, the vast bulk of the world's groundnut crops go into food products. There are, however, materials produced that are not suitable for human food which can be regarded as by-products of this food industry. These include the shells, skins, and hearts that are separated in processing, inedible grades of groundnut oil, press cake, and inedible grades of groundnuts. Many attempts, more or less successful, have been made to develop additional uses for these products.

Groundnut oil goes for the most part into edible products, but various non-food uses have been developed, including the manufacture of soap, shaving cream, cosmetics, and pharmaceutical preparations. It has been found to be an excellent massage oil, and has also been used as a carrier for drugs such as adrenalin and penicillin. Other possibilities reported include the use of groundnut oil in boring compounds, oil sprays and insecticide emulsions, as a textile lubricant, and for leather impregnation.

The values of groundnut oil and other vegetable oils as lubricants, diesel fuels, sources of petrol and kerosene substitutes, and for heating and lighting purposes have been studied in countries where such oils are cheap and abundant, or where such developments have been fostered by petroleum shortages. These applications, however, appear to be of little interest in countries where mineral oil, either indigenous or imported, is available at a reasonable price.

Insecticidal Applications

Groundnut oil has proved valuable in experimental insecticidal applications. Crude groundnut, cottonseed, and corn oils were found to be equal or superior to petroleum oil in the control of Mexican mealy-bugs, while the refined oils were less effective. The addition of 2 per cent. of groundnut oil increased the effectiveness of derris-talc mixtures against pea aphids. The toxicity to the squash bug of derris, nicotine, and other insecticides was markedly increased by the addition of groundnut oil, and sprays containing 1 per cent. of groundnut oil were not injurious to the squash plants. These experimental findings suggest possible significant uses for groundnut oil in the insecticide field, and a systematic appraisal of its value in this direction would appear desirable.

Olive oil is used in considerable quantities as a textile lubricant, especially in the carding of wool. The shortage of olive oil during the war led to the consideration of substitutes, and groundnut oil proved to be the most satisfactory substitute available, after refining and stabilisation with anti-oxidants. In the United States, the oil was hydrogenated and then subjected to solvent winterisation, which caused the undesired material to solidify. The solid material was removed by filtration, and the modified oil recovered from the solvent to the extent of 78 per cent. of the original. This oil was not very suitable for sulphonation, but an interesterification process was developed that produced an oil that could be sulphonated.

Uses of Groundnut Protein

Groundnut protein appears to have important possibilities as an industrial material, though here again economic considerations may limit its development. At present, the press cake meal, which contains from 40 per cent. to 50 per cent. of protein and is the logical source of industrial protein preparations, is in strong demand as a cattle food, and large-scale developments of industrial products must obviously await the reappearance of adequate supplies of other forms of fodder. In the meantime, however, experimental work is proceeding which may well bear fruit with the improvement of the animal food position.

The extraction of groundnut protein has been comprehensively studied, and it has been shown that more than 80 per cent. of the nitrogen can be extracted by water at *p*H 6·6 and more than 90 per cent. by weakly alkaline solutions of *p*H 7·2 and over. The heat treatment to which groundnuts are subjected in extraction causes a certain amount of denaturation of the protein, but even denatured protein can be extracted by dilute alkaline solutions, though for the production of protein for industrial use heat treatment should be kept at the lowest level compatible with satisfactory oil removal.

The alkaline solution of protein is then acidified by the introduction of sulphur dioxide or other medium, whereupon the protein separates out as a curdy precipitate. The curds are de-watered by heating to 50° C. before the liquid is removed, and then dried. The dry product can be readily redissolved in water if the acidity in the curds is neutralised with alkali before drying.

Elimination of High Colour

Most commercial meals yield protein preparations that have an objectionably high colour, due to the red skins, which are ordinarily not removed before crushing. This colour can be avoided or removed by blanching the groundnuts before crushing, by washing the nuts in cold, dilute alkali, rinsing to remove excess alkali, and drying before crushing, or by extracting the moist protein precipitate with various organic solvents.

A number of industrial uses of groundnut protein are contemplated. If available in quantity and at reasonable cost, the material could form the basis of textile fibres, adhesives, coatings, size, plastics, and probably other products. It is also a possible source of amino acids and other protein derivatives.

News from the Industry

FORTHCOMING EVENTS

Industrial Measuring Instruments

All interested in electronics and process control are invited to attend an exhibition of industrial measuring instruments to be held by Marconi Instruments at their London showroom, 109, Eaton Square, London, S.W.1, from March 14 to 25. Among the exhibits will be the latest *p*H meters and moisture meters, a range of industrial recorders, and a number of general purpose instruments for widely differing applications. There will be many working models.

Health Congress at Brighton

The Council of the Royal Sanitary Institute announce that the Presidents of the sections of the Health Congress, which will take place at Brighton from May 23 to 27 next, will be as follows:

Section A: Preventive Medicine. *President:* Professor Andrew Topping, T.D., M.A., M.D., F.R.C.P., F.R.S.E., Professor of Preventive Medicine, University of Manchester.

Section B: Engineering and Architecture. *President:* Sir Lancelot Keay, K.B.E., M.Arch., P.P.R.I.B.A.

Section C: Maternal and Child Health. *President:* Professor W. S. M. Craig, M.D., F.R.C.P.(Edin.), Professor of Pediatrics and Child Health, University of London.

Section D: Veterinary Hygiene. *President:* H. T. Matthews, F.R.C.V.S., B.V.Sc., D.V.H., President, Sussex Veterinary Society; Superintending Inspector, Ministry of Agriculture and Fisheries.

Section E: Food and Nutrition in conjunction with Food Group, Society of Chemical Industry. *President:* E. B. Hughes, D.Sc., F.R.I.C., chairman, Food Group, Society of Chemical Industry.

Section F: Housing and Town Planning. *President:* J. W. R. Adams, F.R.G.S., F.I.L.A., President, Town Planning Institute; County Planning Officer, Kent C.C.

Section G: Tropical Hygiene: *President:* Professor P. A. Buxton, C.M.G., F.R.S., Professor of Entomology, London School of Hygiene and Tropical Medicine, University of London.

Section H: Hygiene in Industry. *President:* Professor T. Ferguson, D.Sc., M.D., F.R.C.P.(Edin.), D.P.H., Professor of Public Health, University of Glasgow.

In addition, there will be conferences of medical officers of health, engineers and surveyors, and sanitary inspectors. The Presidents of these conferences will be the President of the Society of Medical Officers of Health (Professor R. H. Parry), the President of the Institution of Municipal Engineers (Mr. Charles Greenwood), and the chairman of the General Council of the Sanitary Inspectors' Association respectively. There will also be a conference of health visitors, under the presidency of Mr. Reginald Stamp, chairman of the Health Committee of the London County Council.

Films of public health interest will be shown during the congress, and visits will be arranged to places of interest.

The President of the Health Congress will be His Grace the Duke of Norfolk.

Royal Institute of Chemistry

The following meetings are included in the spring programme of the London and South-Eastern Counties Section of the Royal Institute of Chemistry:

Mar. 4. Social-Dance. 7 p.m. at the Oak Restaurant, Slaters, Ltd., 18, Kensington High Street, London, W.8.

Mar. 8. "Drug-Action, Ions and Neutral Molecules." (Jointly with the Welwyn Garden City Scientists' Club.) A. Albert, D.Sc., F.R.I.C., Hon.F.P.S.(Victoria). 8 p.m. at The Cherry Tree, Welwyn Garden City.

Mar. 21. "Quantitative Common Sense and the Chemist." E. C. Wood, Ph.D., F.R.I.C. 7 p.m. at the County Technical College, Essex Road, Dartford.

Mar. 22. "Modern Methods of Organic Solvent Manufacture." J. L. Edgar, Ph.D., A.R.C.S., F.R.I.C. 6.30 p.m. at the South-East Essex Technical College, Longbridge Road, Dagenham.

Mar. 24. "The Chemistry of Semiconducting Solids." J. S. Anderson, Ph.D., A.R.C.S., D.I.C. 6.45 p.m. at the Material Research Laboratory, Philips Electrical, Ltd., New Road, Mitcham Junction.

Mar. 30. Part-time Education in Chemistry: "Organisation." J. Dimmick, B.Sc., F.R.I.C. "Industrial Schemes." H. J. Barber, Ph.D., F.R.I.C. "Official Encouragement." P. C. L. Thorne, M.A., Ph.D., F.R.I.C. "The Student's Viewpoint." K. G. A. Pankhurst, Ph.D., F.R.I.C. "Qualifications and their Status." A. M. Ward, Ph.D., D.Sc., F.R.I.C. "Chemistry and Technology." (Jointly with the B.A.C. and A.Sc.W.) H. L. Howard, B.Sc., D.I.C., A.M.I.Chem.E., F.R.I.C. 6.15 p.m. at Gas Industries House, 1, Grosvenor Place, Hyde Park, London, S.W.1.

Apr. 7. "Recent Developments in Biochemical Research." (Jointly with the Luton Scientific Association.) E. Lester Smith, D.Sc., F.R.I.C. 7.30 p.m. at the Public Library Lecture Hall, Luton.

Apr. 20. A symposium on "Standardisation in the Chemical Field." 3 p.m. at the London School of Hygiene and Tropical Medicine. Keppel Street, London, W.C.1.

Apr. 29, 30. Anniversary meeting and annual general meeting of the Institute.

Britain's Productivity Illustrated

The urgent necessity for higher industrial productivity at lower cost will be the theme of an exhibition entitled "On Our Way," which is to be staged at the Central Office of Information's Exhibition Hall on March 21 for six weeks. The state of the nation before the war, after the war, now, and in 1952—when Marshall Aid ends—will be graphically displayed, and this will be followed by a "Four Point Plan for Britain," demonstrated on revolving stages under the headings "Export More," "Supply Ourselves," "Help the Non-Dollar Countries to Recover," and "Import Less from Dollar Countries." Cartoon displays will cover the major problems of labour, mechanisation, reduction of cost, productivity, and kindred subjects, and there will be dioramas on the essential need for increased production of coal, iron, and steel, vehicles and rolling stock, chemicals, agriculture, and other products.

Intending visitors are invited to make up parties to visit the exhibition at specially booked times, when they will be officially received and conducted round the hall, after which there will be an opportunity in the small conference room for questions and discussion on the exhibits.

Food to be Boosted at Ideal Home Exhibition

The food and drink sections of the *Daily Mail* Ideal Home Exhibition to be held at Olympia from March 1 to 26 promises to be the biggest ever. In the past food and cookery have been combined in one section, but because of the increased number of exhibitors this year it has been necessary for each to have its own section.

Visitors will be able to sample and buy all kinds of food and fresh frozen fruit and to purchase bread which they have watched being prepared and baked.

Exhibition of Packaging Materials

Exhibits including packages illustrating the use of new materials and interesting production techniques, or which possess some unusual design feature, are to be shown at an exhibition to be held at Murray House, Petty France, London, S.W.1, from May 3 to 31. The Institute of Packaging and the Printing, Packaging and Allied Trades Research Association are collaborating with the Council of Industrial Design in arranging this exhibition, which will show some of the more interesting packaging materials in current use as well as recent developments, and manufacturers who feel they have products suitable for inclusion in this display should write to the Council.

The exhibition is the second in a series organised by the Council to assist designers in their day-to-day practice and as an information service to production and sales executives. The first of the series, "Synthetic Boards, Plastics Laminates, and Resin-bonded Materials," was held in October last. The exhibitions are selective; they are not open to the general public and there is no charge for stand space.

Industrial Management

The first in a series of publications published by the British Institute of Management as a contribution to its range of literature, *A Short Survey of Industrial Management* contains sections on the nature, the evolution, the mechanics, and lastly the dynamics of management.

A range of food packages produced by Associated Bowater Industries.

New Plant Installed

An extensive rebuilding programme, including the installation of new plant, is being carried out at Broadway Works, London, where George Clark and Son produce their well-known sugar specialities, and various grades of colour caramel for the soft drinks, wines, spirits, cider, beer, and foodstuffs industries. A fully equipped research department is devoted solely to caramel problems and continual progress is being made in this field. The illustration depicts an artist's impression of the approach to the works.

Artist's impression of the approach to George Clark and Son's new works.

Complementary Packages

Each package, be it corrugated box, fibre drum, or paper bag, supplied by Associated Bowater Industries through their constituent companies is made complementary to the other two, so that a suitable package can be offered for any particular product.

A design service to ensure that the highest level of packaging, based on his particular requirements, is available to each customer is maintained at their fibre container works, where high speed box-making machinery is in operation. In their fibre drum plants, the organisation make a large variety of cylindrical containers which carry weights up to 3 cwt. of materials in powder, crystal, or paste form, as well as made-to-measure packs for certain trades.

Their paper bags, in kraft, sulphite, and grease-proof, are made in a wide variety of sizes and types. Transparent film bags, plain and printed, are also manufactured.

Solvent Extraction

Many thousands of tons of oil are wasted today because of inefficient processing equipment and in their leaflet entitled *The A B C of Solvent Extraction*, Bamag set out the advantages of this process in securing increased production. A description of the various stages involved is accompanied by diagrams together with photographs of installations of their extraction plant.

Instrumentation in Industry

Designed to give a general idea of their industrial and meteorological instruments in a form suitable for long-distance mail in connexion with export promotion, Negretti and Zambra have produced a new list (B.19) which describes a representative selection of their latest instruments. Products covered include thermometers, pyrometers, meters, controllers, and gauges; the list concludes with temperature and general conversion tables.

Operating Frosters

Installation and operation instructions, anti-freeze precautions, and a detailed illustrated description of their Junior Froster are contained in an instruction manual recently issued by Jackstone Froster. The froster, which will be of interest to all connected with the quick freezing of food, operates equally successfully afloat and has been installed on many whaling and fishing vessels.

Cellulose Tape Seals Oxo Packs

Originally soldered in place to ensure an airtight seal, the inner tinplate lids fitted in Oxo tins destined for overseas markets are now being sealed with transparent "Sellotape." The outer lids are sealed with ½ in. tape as a final safeguard and in this form the packs have been exported successfully to countries with some of the worst climates in the world. This self-adhesive cellulose tape, marketed by Gordon and Gotch, is effective in saving time and money and does not require highly skilled labour for its application.

New Pallet Truck

Effective in restricted spaces such as loading lifts, narrow aisles, and in commercial refrigerators, a recently produced pallet truck has a load capacity of 2 tons and its hydraulic mechanism quickly lifts pallet or stillage loads up to a weight of 4,500 lb. The manoeuvrability and slender body of the truck, which is produced by Matling, Ltd., enables a pallet load to be pivoted on its own axis, the truck to be withdrawn in as little space as the length of the pallet, and entry and exit to the pallet to be made at acute angles.

The lowered height of the truck without a stillage attachment enables it to work with any standard gap pallet. Leading and trailing wheels are fitted to the fingers, thus facilitating the mounting of pallet-bottom deck slats.

Alternative locking positions of the handle enable the truck to be pushed or pulled conveniently by people of different height, the hydraulic pump handle being conveniently placed for raising the load. Lowering is effected by a knob which controls the lowering speed.

Sales Managers' Examinations

The next examinations (Qualifying and Final) in "Sales Management" to be held by the Council of The Incorporated Sales Managers' Association are to be held on May 26, 27, and 28. Entry forms and full particulars may be obtained from the Association at 23, Bedford Square, London, W.C. 1.

Since 1936 the Association has conducted an examination in "Salesmanship" and the last examination under the existing syllabus will be held on May 28. Entry forms for this examination may also be obtained from the secretary. As from 1950 the examination, suitably revised, will become the responsibility of The United Kingdom Commercial Travellers' Association, 180, Tottenham Court Road, London, W.C. 1.

Obituary

We regret to record the following deaths:

Alderman John Septimus Hill, an ex-Lord Mayor of Manchester and pioneer of Lancashire's tripe-making industry. He started his new venture of preparing tripe for human consumption more than fifty years ago by selling it in the streets of Manchester from a handcart. In 1911 he and his brother opened their first retail shop and in 1920 Alderman Hill became chairman and managing director of United Cattle Products, which now owns twelve works and controls about 150 shops and restaurants in Lancashire and Cheshire.

Mr. Arnold Groeger, manager of the sugar factory at Thurles, Co. Tipperary, since its establishment in 1934.

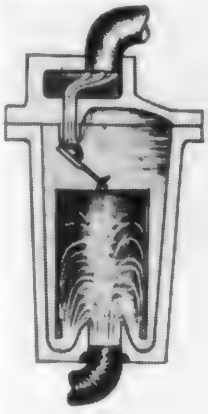


FIG. 1.

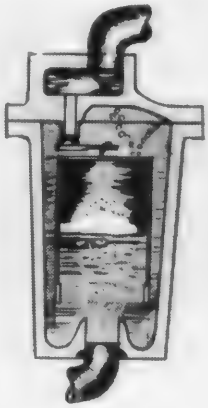


FIG. 2.

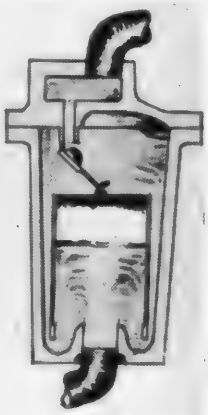


FIG. 3.

Steam Traps

Rapid air discharge, simple and rugged design, and dependable operation are notable characteristics of the steam trap manufactured by the Drayton Regulator and Instrument Co. Fig. 1 shows the trap starting up from cold, when condensate will flow freely through the trap, scrubbing out the sediment trough and carrying all small dirt through the fully open valve. In Fig. 2 steam is seen entering the inverted bucket of the trap, causing it to rise and close the valve. Air escapes from the bucket through a vent in the top, accumulating under the cover. This is followed by the action shown in Fig. 3 when the condensate enters the trap—the bucket falls and the valve is opened. Scrubbing again takes place, and accumulated air is discharged from the top of the trap.

An outstanding feature of the Drayton-Armstrong trap is the hemispherical ball valve and floating lever, the latter guaranteeing positive action and long operating life. No leverage is applied by the upward movement of the bucket, the force holding the valve closed being provided by steam pressure alone. As the valve approaches its seat, the high velocity of the steam passing through a rapidly diminishing annular space causes it to close with a snap action.

Improved Transport Unit

With engine and driver's cab placed well forward of the front axle, the Karrier "CK3" model is available with alternative wheelbases, both relatively short, and the design is such that not only can a 15 foot body be carried on the longer wheelbase chassis but a balanced load distribution which improves mobility and running economy is also obtained. Although varying types of bodywork —van, platform, and dropsider— can be accommodated, "CK3" chassis are not intended for use as tippers.

The power unit is a six-cylinder of the side-valve type developing 80 b.h.p., and the chrome finishing of its cylinder bores by the "Listard" process, "Van der Horst" patents, supplies the answer to all forms of cylinder wear, and is of special value in those instances where operating conditions involve frequent stopping and starting.

The gearbox employs silent helical gears for top and third ratios and provides two power take-off openings for auxiliary drives. Cushioned rubber type universal joints smooth out the drive and require no lubrication, while the sturdy rear axle of the spiral bevel type embodies fully-floating drive shafts. Powerful hydraulic brakes of the two-leading-shoe type are fitted and the electrical equipment incorporates a dynamo of the compensated voltage control type.

Citrus Fruit Juices Control

In consequence of the general increase in C. and f. prices of fruit juices, the Advisory Committee announce that the standard price, *i.e.* 4s. 6d. per unconcentrated gal., which has operated hitherto, must be increased.

After careful consideration the Advisory Committee has reached the conclusion that the standard price for all varieties for 1949 must be 5s. 3d. per gal., and they therefore inform allottees accordingly. The distributors' margin of 6d. per gal. remains unchanged, and, where it applies, will be added to the standard price.

In the event of any allottee in consequence of this information desiring to reduce his estimated requirements for 1949, he should advise Whinney, Smith and Whinney, 4 B, Frederick's Place, Old Jewry, London, E.C. 2, as early as possible.

Engineering Firm's Reorganisation

Owing to the rapid expansion of the business in recent years certain changes in organisation have been made by Henry Simon, Ltd., for the sake of administrative efficiency. The firm has hitherto been both a trading and a holding company; besides carrying on the two principal businesses of (*a*) flour and provender milling engineering, and (*b*) mechanical and pneumatic handling, it also has several other departments and owns a number of subsidiary companies.

The two main departments have now become so large that as from January 1, 1949, they have been turned into separate trading companies. The milling department continues to be called Henry Simon, Ltd., and the former conveying department becomes Simon Handling Engineers, Ltd. The parent company, Henry Simon (Holdings), Ltd., completely owns and guarantees the two trading companies and will function as a holding company for the co-ordination of general policy. It is emphasised that this reorganisation involves no change whatever in general policy or personal relations with clients, and that the management remains in the same hands as hitherto.

New Mechanical Seal

Under the designation "Type RE," a new range of seals for existing designs of refrigeration compressors has been put on the market. Although costing less than the "Type R" seal of the same size, also manufactured by Flexibox, the new seal retains the main features of a resilient yet positive spring drive, a die-cast rotary seal ring, an O-ring seal between shaft and rotary seal ring, and a self-lubricating compounded stationary seal ring carried by a resilient synthetic rubber support.

Instead of being housed in a recess in the crankcase and retained by a backing ring, the new seal is housed in a detachable flanged cover which is part of the original crankcase assembly and need not be changed if it is necessary to replace the seal.

Before fitting the cover, the shaft is exposed for cleaning, inspection and installation of the seal, whereas in the conventional type of crankcase the fitter has to work "inside" the seal recess— making efficient inspection of the shaft practically impossible and the fitting of the seal far more involved. The same considerations apply to subsequent maintenance.

Shaft overhang can be considerably reduced by adopting this seal since no additional space is required for the heads of the cover screws. In certain cases it is possible to offset the flywheel in the direction of the crankcase, thus effecting a further saving in overhang.

New List of Flavourings

A new price list giving details of their wide range of flavouring essences, colours, liquid preservatives, and liquid heading, of interest to the bakery, confectionery, ice cream, and mineral water trades and allied industries has been issued by Lautier Fils.

Extracting glass fragments from valve-sealing machine by means of a B.V.C. cleaner.

Industrial Vacuum Cleaner

From time to time a number of efforts have been made to find the most satisfactory way of removing during manufacturing processes the surplus glass fragments which remain. The installation of a T.22 vacuum cleaner, made by the British Vacuum Cleaner and Engineering Co., solves this problem, for the powerful suction of this machine speedily withdraws both glass particles and dust into the cleaner bag without danger to the operator. In addition to providing healthier conditions for the worker, this method of pneumatic extraction promotes higher production and all-round efficiency in the factory.

Unilever Chairmen Entertain

Chairmen of six of the food companies of Lever Brothers and Unilever gave a dinner at the Berkeley Hotel, London, on January 25 in honour of Mr. J. P. Van den Bergh, C.B.E., and Mr. R. E. Huffam, of the national management.

Hosts were Mr. Cecil W. Rodd, of T. Wall and Sons, Mr. Neil Mackay, of MacFisheries, Mr. D. Tobey, of Associated Canners, Mr. M. W. Batchelor, of Batchelors Peas, Mr. G. W. Muddiman, of Birds Eye Foods, and Mr. O. L. S. Philpot, of Trufood.

Flexible Couplings

Designed to accommodate misalignment in direct coupled rotating shafts and to enable drives to operate satisfactorily even where such factors as bearing wear, temperature changes, and misalignment of the driving and driven units develop, a series of couplings are now included in the range of rubber products produced by J. H. Fenner and Co.

Known as "Resilla" Bond flexible couplings, they consist of rubber bonded between two flanged metal parts and this construction effectively prevents the transmission of vibration from one machine to another.

For transmitting light and medium powers the coupling is unique for simplicity, low cost, and efficiency.

Over a Thousand Years' Service

Presentations have been made to thirty-six employees of Scribbans-Kemp (Halifax), Ltd., biscuit manufacturers, who have served at the Kingston factory for a total of 1,083 years. The presentations were made by Dr. W. Clayton, production director of the parent firm and a director of the local firm, deputising for Mr. Oliver King, chairman of the group. Mr. J. S. Hathaway, director and general manager of the firm, presided.

Steel Storage Equipment

All kinds of steel storage equipment, ranging from storage bins, racks, and shelving, to conveyors, flooring, and cabinets, are supplied by Timson Bros. In addition to separate items which can be made to suit particular requirements, the firm supply a complete stores layout including panel partitioning with weld mesh top and sheet bottom, hinged drop serving hatch, swing and sliding doors, and storekeeper's office with glazed or weld mesh covered top.

Sugar Confectionery Scheme

A scheme of rationing by manufacturers of their production of unrationed products is believed by the Sugar Confectionery Manufacturers' Association to be still necessary in order to ensure that wholesalers and retailers receive their fair share. Wholesalers should also be advised to endeavour in turn to do likewise with their allocation of unrationed goods, so that even distribution is assured of these unrationed lines. The Association suggests that manufacturers (and wholesalers) should send out a circular letter worded to suit their own particular business which clearly states the rationed confectionery allocation and de-rationed entitlement for certain periods according to how their journeys are worked. This means that de-rationed goods will still be rationed to traders by manufacturers and wholesalers until all chocolate and confectionery come off the ration, and the Association are of the opinion that it is the only fair way to deal with partial de-rationing.

Casemaking for Machine Packing

MATERIALS FOR BEST RESULTS

That the problem of packing should be faced at the blue print stage, and not left until the machine is in production and being advertised, was stressed by Mr. H. E. Goold in his address at a recent meeting of the Institute of Packaging. The machinery packer, he said, is also an engineer; he has the proper mechanical knowledge which enables him to take down parts without damage and has a most comprehensive range of equipment for this purpose. Also he can suggest modifications which enable the machine to be transported safely to its destination. Such points can be foreseen and introduced when the machine is being designed.

In spite of the experience gained in the war many exporters still think of the casemaker and packer in terms of nuisance value. Such an outlook can be disastrous to the economy of this country since one British-made machine delivered in a damaged condition could allow a foreign competitor to capture the market.

Mr. Goold then dealt with certain aspects of casemaking and said that for machine packing, timber with a moisture content not exceeding 20 per cent. or less than 12 per cent. should be used. Cases made of stout material are, however, not always the strongest. Moreover a strong case may impart all the shocks to the machine.

Machinery cases should be made of T and G timber, but where this is not possible cases should be lined with roofing felt—kraft union bitumen-lined paper, or bitumen-lined paper reinforced with sisal. Roofing felt, however, is more liable to condensation than paper; this being so, a reinforced waterproof paper is necessary and ends should be sealed with a waterproof adhesive. All parts liable to corrosion should be treated with an anti-rust solution.

The packer should mark cases quite clearly where the lifting hooks or grabs are to be placed; such points must, of course, be properly braced. In some circumstances iron lifting bands are desirable, and add strength to the case. When returnable cases are used a closure fitting is better than continual nailing and renailing; alternatively a captive screw case plate can be used.

Appointments

W. A. Murray and Co., 147, Bath Street, Glasgow, C. 2, have been appointed by Small Electric Motors as their representatives in Scotland. Their new representative for the Midlands area is Mr. A. J. Mare, of 18, Newhall Hill, Birmingham, 1.

■

Mr. T. H. Eccles has been appointed manager of the London office of Musgrave and Co. in succession to Mr. T. A. Patterson, who has resigned.

■

Mr. A. L. Bacharach, M.A., F.R.I.C., has been appointed to the staff of the public relations director, Glaxo Laboratories. His long scientific and editorial experience will thus be available to assist all sections of the company's public relations organisation. W. F. J. Cuthbertson, Ph.D., F.R.I.C., will succeed him as head of the nutrition unit of the research division.

The Rt. Hon. Lord McGowan, K.B.E., D.C.L., LL.D., chairman of Imperial Chemical Industries, has accepted an invitation to become the first patron of the Purchasing Officers' Association.

■

Mr. A. L. Trundle, O.B.E., has joined Mr. A. R. Lorimer as joint managing director of United Phosphate and Malt Co. He succeeds Mr. E. P. Hatschek, who has resigned after twenty-six years' service with the company. Mr. Hatschek is to remain a member of the board of directors.

■

After many years' service with the Kestner Evaporator and Engineering Co., Ltd., Mr. J. W. Grose, B.Sc., A.C.G.I., A.M.I.Chem.E., and Mr. G. H. Black have been appointed to the board of directors.

■

Mr. J. A. Watson, Mr. A. R. Foxall, and Mr. E. R. S. Winter have joined the board of directors of John and E. Sturge, Ltd.

Fifty Years' Service

A luncheon in honour of Mr. G. W. Riley, a technical director of George Scott and Son, and Ernest Scott and Co., was given at the Connaught Rooms recently to celebrate his completion of fifty years' service with the firm. Mr. Riley, who joined the firm as a junior in 1899, started work under Frank W. Scott, son of the founder, George W. Scott.

Silver Wedding

The silver wedding of Mr. and Mrs. J. E. Cohen was celebrated on January 29 at the Dorchester Hotel, where they entertained their friends to a dinner and dance. Besides being chairman of Tesco Stores, Ltd., Mr. Cohen is also chairman of Goldhanger Fruit Farms, Edmonton Packers, Ltd., J. E. Cohen and Co., Ltd., and Railway Nurseries (Cheshunt), Ltd.

Automatic Disposal Cabinet

Designed to give a simple and trouble-free service, an automatic cabinet for the disposal of dressings, bandages etc., known as the "Barrywald," can be operated by anyone and merely requires the depression of a lever on the left side of the unit. This action sets the automatic mechanism into operation by opening the receptacle, fume box and combustion chamber covers, clearing the combustion chamber of ash remaining from any previous insertion, and by tilting the mercury vacuum switch. The latter then switches on the electrical components, consisting of specially designed heating elements, to begin the disposal action. The signal indicator in the front of the cabinet and a synchronous time control unit are so designed as to return the mercury switch to its "off" position in five to seven minutes when the current is automatically cut out. With each depression of the lever the time control unit is reset to its starting position although the cabinet, produced by Allied Metals, may already be in operation and ensures full burning time for every article placed therein. Insertions can be disposed of at the rate of one a minute.

English Oilseed Production

Recently formed to foster the large-scale growing of sunflowers (*Helianthus annuus*) in this country, Solflower, Ltd., will make contracts with farmers and give advice on the crop. An experienced firm of seed crushers will process the seed, and improved machinery for decorticating purposes has been designed.

It is proposed to utilise the kernels, which are rich in vitamins, protein, and fats, for specialised foods and confections, and to provide useful quantities of first-class edible oils (and, in later years, of animal feedingstuffs) for the Ministry of Food.

The land under sunflower cultivation will be mainly in East Anglia and the southern counties, and the target set for 1949 is 5,000 acres.

Lime Water Softener

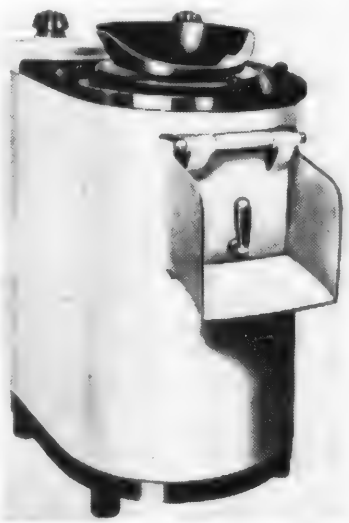
The "Spiractor," a new design of lime softener, accomplishes the removal of calcium bicarbonate hardness from water in five minutes, as compared with the three or four hours' treatment usually needed. The treatment is done under pressure, without heat, in a small tank of inverted conical form. Raw water and measured lime emulsion are introduced at the base of the cone, thorough mixing takes place, and reaction occurs rapidly while the water is travelling rotatively upwards towards the outlet.

The tank contains a bed of preformed calcium carbonate granules which are held in suspension by the rising water, and which act as nuclei for the agglomeration of the precipitated calcium carbonate hardness. All precipitate crystallises on the granules, and a soft and stable water is produced with only five minutes' detention time. On leaving the tank, the water is filtered, and, if necessary, the residual hardness it contains can be removed by final base-exchange softening. There is no sludge to remove, all waste matter being formed into hard, easily-handled pellets.

Developed by the Permutit Co., the "Spiractor" is simple to operate and produces non-scaling feed-water without corrosive properties at low cost.

Exhibits at Manchester

A comprehensive range of their Q.P. homogenisers, ranging from a hand-operated model to a power model delivering 100 gal. per hour at 1,000 lb. per sq. in. pressure, a heat treatment unit, and a patented cream whipper were shown by Ormerod Engineers at the Hotel and Catering Exhibition held at Manchester last month. The larger of the two heat-treatment units manufactured by the company secured the Silver Medal for New Inventions at the 1948 Dairy Show. The "Quipper" patented cream whipper is designed to deliver whipped cream from real or synthetic cream, and a working model of the equipment was shown for the first time at this exhibition.



Twenty-eight lb. of potatoes are peeled in seventy-five to ninety seconds by this machine.

Among the wide range of scales and electric food machines exhibited at Manchester by Swift and Swallow was a new electric peeler which deals with 28 lb. of potatoes in seventy-five to ninety seconds. A special ramp imparts a rotating motion, mixing the batch continuously and ensuring that all potatoes are evenly peeled, with minimum loss of weight. Another improvement is the use of abrasive on the specially designed revolving plate only—the sides of the drum being plain. Two knobs control the switch and water spray. The top plate is easily removed for cleaning and the discharge door is watertight and secured by a quick-action locking device. The motor and reduction gear are of high standard and a pressure-tested oil seal prevents any water from the drum entering the mechanism which is grease-packed and needs no attention.

Hebridean Whaling Industry

The revival of the whaling industry on the island of Harris is planned by a new company, Scottish Whalers, Ltd., who intend taking over the station at Bunaveneader, West Tarvert, which was closed down over twenty years ago.

As soon as a licence has been secured, the company will acquire corvettes for whale-catching and instal plant at Bunaveneader.

When this project is well under way, the company may open another whaling factory in Shetland, and they are also interested in a derelict station in Ireland.

The Harris scheme, which is expected to take between £60,000 and £70,000 to launch, will provide employment for six months of the year to at least eighty men at the outset.

A retired Naval officer, Captain Donald J. Munro of Kirkcudbrightshire, who first introduced whaling ships to the Navy as submarine chasers, is behind this project, which he believes will be of great help to the Hebrides.

Sauce Chiefs Visit Australia

In order to expedite development of plans made two years ago for a closer tie-up on production and marketing in all the principal countries of the world as well as to introduce and absorb new methods, Mr. John L. Deverell, chairman, and Mr. Harry F. T. Wren, managing director, of Holbrooks, flew to New York recently on the first stage of their journey to Australia.

Mr. Deverell and Mr. Wren, who will be calling at San Francisco, Honolulu, and other places, will be looking into the prospects of increasing exports to the U.S. and other countries, and are intending to return *via* South Africa and possibly India to examine the condition of the markets there.

Whale Meat Advisory Bureau

Under the direction of Mr. J. A. Brewster, a member of the Institute of Refrigeration and the Council of the Institute of Meat, a Whale Meat Advisory Bureau has been set up at 41, Upper Grosvenor Street, London, W. 1, to provide information on whale meat and its products.

When whale meat becomes available in larger quantities than at present, a kitchen will be opened at the Bureau to give guidance on its cooking and preparation.

Changes of Address

The London office address of Newman Industries, Ltd. (Electric Motor Division), is now 49, Park Lane, London, W. 1. Telephone: Grosvenor 4905-9.

The address of Economic Utilities, exporters, importers, and suppliers of raw material for the food industry, bakery, catering, and ice cream establishments, is now Stone House, Bishopsgate, London, E.C. 2. Telephone: Bishopsgate 5526.

Town Appeals for Canning Plant

Campbeltown has revived its claims for a canning plant and is appealing to the Herring Industry Board to review the situation there with a view to establishing such an industry locally. The surplus of female labour in the town, the fact that it is a focal point for Clyde and west coast fishing, and is in the hydro-electric area are arguments advanced by Campbeltown to support its claim.

Census of Distribution

As recently announced by the President of the Board of Trade, the Census of Distribution has been postponed for one year and will be taken in 1951 covering the year 1950. An Order to this effect has now been made (S.I.1949 No. 130).

This postponement in no way affects the Census of Production which is now being taken in respect of the year 1948.

The only Census of Distribution forms which were in the course of being printed were specimen forms on cheap paper for the guidance of traders. It will be possible to use almost all of these forms for the 1950 Census.

Quick Freeze Plant Expansion

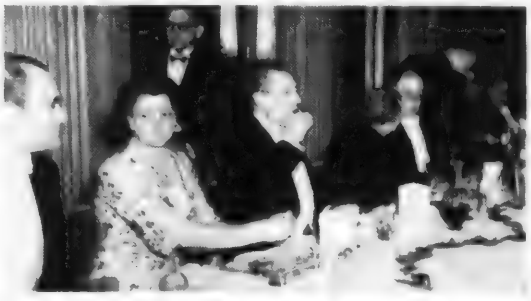
As an extension to their quick freeze plant in Thurso, St. Clair Fisheries are erecting a fish meal factory. This plant is one of several quick freeze units established in the north of Scotland as a result of Herring Industry Board example and the expansion of electrical services throughout the area.

Food Yeast from Molasses

A new food yeast produced from sugar molasses is of high protein value and is one of the richest sources of Vitamin B_1 and B_2, riboflavin, and nicotinic acid. Used as an addition to normal foods it greatly improves the health of people suffering from malnutrition. It is sweet with a pleasant "meaty" flavour and can be used for flavouring in both dry and wet foods.

Production of this food yeast began in 1946 at the Frome, Jamaica, factory of Colonial Food Yeast, a Government undertaking sponsored by the Colonial Office, and is now being marketed in this country by Couper, Friend and Co.

Left to right: Dr. Hughes, Mrs. Lampitt, Dr. Baines, Mr. Bunker, Mrs. Griffin, Dr. Nicholls.



Left to right: Dr. Davis, Mrs. Baines, Dr. Lampitt, Mrs. Hughes, Mr. Robson, Dr. Baines.

The Food Group holds its First Annual Dinner-Dance

The first annual Dinner-Dance of the Food Group of the Society of Chemical Industry which took place at Grosvenor House, London, on Monday, February 7, was unanimously acclaimed a complete success. The large banqueting hall was occupied by a little under 200 guests.

In a pleasing speech, Dr. E. B. Hughes, chairman of the Group, welcomed the members and their guests, included among whom were members of the other Groups of the Society; Mr. S. Robson replied.

Dr. J. R. Nicholls wittily proposed the toast of the ladies, to which Dr. Thelma Reynolds of the Council of Scientific and Industrial Research of Australia responded. Welcoming the system sponsored by the Council whereby scientists from Australia visited England, Dr. Reynolds suggested that similar arrangements should be made for the British scientist to visit Australia.

While the tables were being cleared, the company foregathered in the ante-room and half an hour's animated conversation among rapidly changing groups was enjoyed. One of the particular characteristics of the members of the Food Group is that they do not form themselves into cliques; the whole evening was notable for the spirit of *camaraderie* which prevailed. To the strains of music from Sidney Lipton's orchestra dancing went on until midnight.

Booklets Received

Based on the company's long experience in the field of power transmission, a catalogue entitled *Eighty-five Years of Progress* has been issued by J. H. Fenner and Co. It gives a concise but complete review of products manufactured and a brief summary of new products and developments in V-belts and V-belt drives, leather and woven beltings, hydraulic mechanical and pneumatic leathers, mechanical rubber products, spindle tapes and webbings, and synthetic rubber roller coverings.

■

The various problems facing food manufacturers who wish to embark on an advertising campaign or are dissatisfied with the results they are now getting are dealt with in a booklet compiled by Erwoods, international advertising agents since 1895. Advice as to the character of a new line, help in design of packing or label and suggestions for showcards and other dealer aids are included in the service of this company.

■

Prepared for the benefit of the dairy industry, a new booklet issued by Joseph Crosfield and Sons gives clear, practical instructions for the efficient cleaning of dairy plants by the use of modern detergents specially developed for the purpose. Notes on the cleaning of tanks, pasteurisers, pipe lines and other items are accompanied by clear illustrations, and the booklet concludes with a brief description of the grades of detergents recommended in the notes.

■

The extensive use of Monel in modern laundry equipment and in plant for the production of high quality starch for this industry is dealt with in the latest issue of *Wiggin Nickel Alloys*. Monel in pickling plant equipment, electrodeposition processes, and home bottling for fruit and vegetable preserves, is also featured in addition to the use of Inconel in a new portable gas fire and case-hardened boxes for electrical and ancillary equipment in commercial vehicles. Another article in this booklet issued by Henry Wiggin and Co. deals with the many applications of bi-metals in automobiles.

OBITER DICTA

● There is more kick in a plate of beef than a loaf of bread.—*Mr. Walter Elliot, M.P.*

● My husband gulps a cup of tea and dashes off to work early in the morning like all other men who are nothing in particular.—*Wife at North London Court.*

● Bind my eyes up, Jenkins. If margarine tastes like butter, this mutton should taste like lamb and the cider like champagne.—*Peterborough in the "Daily Telegraph."*

● In love and sausages only one thing is required—confidence.—*Dr. H. P. Blunt at a meeting of the Nutrition Panel of the Society of Chemical Industry.*

● We have had to change our name from the Bacon Society because we were being confused with the Bacon Marketing Board.—*Mr. Valentine Smith, secretary of the Francis Bacon Society.*

● Now that our Ministers of State have removed the control from cooked beetroot, I am sure we can all look forward to the future with confidence.—*Correspondent to the "Sunday Express."*

● If the Civil Servant, strangled in red tape and politics, and with little experience of trade, fails to bring home the bacon, he has still got his job and his pension.—*Correspondent to the "Sunday Chronicle."*

● The Ministry of Food have just announced that on account of the terrific success of snoek there isn't enough to go round, but we've not to worry, because they've arranged for supplies of tinned kebeljou, which is a snoek's cousin.—*"The Bulletin and Scots Pictorial."*

● We are informed that Dr. Edith Summerskill has six cooks engaged in cooking the "Food Facts" that are advertised, at an expense of £150,000 plus the cooks' salaries. Unfortunately 95 per cent. of our housewives have no time to play at this kind of cooking, and even the miners do not want sprouts *à la Italienne* or snoek with raspberry sauce.—*Correspondent to "The Recorder."*

COMPANY NEWS

Following a recent extraordinary general meeting, Thos. W. Ward, Ltd., announced that four of their local directors, Mr. Phillip T. Ward, Mr. George Stuart Wood, Mr. J. S. Bradshaw, and Mr. E. G. Mort, have now been made directors.

■

Brooke Bond Estates of India, Ltd., are to pay a taxable dividend of 6 per cent. on both preference and ordinary shares for the year ending June, 30, 1948.

The company's report for this period—the first year of operation—states that results are satisfactory but points out that production costs are steadily increasing.

■

A slight fall in the trading profit of Foster Clark for the year to September, 1948, as compared with that for the previous year, was announced by the chairman, Lieut.-Colonel Sir Cyril V. Jones, C.B.E., in his statement with the report. This, he explained, was due partly to reduced income from investments, but more particularly to the effect of continually rising costs of raw material, wages, transport, etc. In view of the balance brought in, however, the company had no difficulty in maintaining the final dividend of 12½ per cent. plus a bonus of 5 per cent., making altogether 25 per cent., the same as for the previous year.

■

An increase in profits for the year, which compared very favourably with the figure anticipated in January, 1948, was announced in the first annual report of Maconochie Foods, Ltd. According to the statement of the chairman, Mr. H. Maxwell-Chalmers, there had been considerable expenditure on plant during the period which practically completed the company's re-equipment programme for its two main factories. Satisfactory trading results were reported for Veemac, Ltd., while the other associated company, Maconochies' Kippers, Ltd., had not completed a full year's trading and had declared no dividends.

A final dividend of 7½ per cent., less tax, for the period since date of incorporation, was recommended, making a total of 12½ per cent. on the ordinary shares.

News from Overseas

Plans for Arctic Whaling

Whales caught along the Norwegian coast are believed to be merely a branch of a much larger stock in the Arctic Ocean, between Bear Island and Spitsbergen. Since output from near-shore whaling cannot be increased much further, plans are being made to send two expeditions to the Arctic Ocean to start exploiting the main stock of this type of whale (vaage or mink whale). A refrigerator ship will be used to carry bunkers to the expeditions and bring back the meat to Norway.

Complete Canning Equipment for Whale Ship

Kosmos V, the latest and largest acquisition by the Norwegian merchant marine, which is to be converted into a factory ship in the spring, is to be run on radically new lines. A complete canning factory with a capacity of 2,000 tons of whale meat, as well as plant for producing vitamin oils from whale liver, are to be installed, while meat extract will also be produced on board the ship.

Postage stamp designs illustrating food production continue to be issued. Top row (left to right): Guadeloupe, 60 c. (grey-black), cutting sugar cane; Gold Coast, 1s. (vermilion and black), breaking cocoa pods; Togo, 60 c. (olive green), coconut industry. Bottom row (left to right): Togo, 15 c. (brown), natives grinding meal; Gold Coast, 6d. (orange-yellow and black), cocoa farmer; Honduras, 16 c. (red), sugar cane plantation.

Australian Beef to go by Air

Australian National Airways have announced that a new company is being formed to erect abattoirs and chilling plant in the Kimberley district of Western Australia and to fly carcass beef to the Wyndham meat works for shipment to Britain. The company, which is to be named Air Beef Proprietary, Ltd., will receive a five-year loan of £10,000 free of interest from the Western Australian Government. It is expected that 4,000 head of cattle will be handled in the first season, beginning in May.

Malaya's Freshwater Fish Plan

The Malayan Fisheries Department is at present engaged in extensive plans to stock the colony's freshwater fish farms with Chinese carp, and each flying boat which arrives in Malaya from Hong Kong brings 10,000 Chinese carp in 4-gallon kerosene tins, averaging 500 fish per tin. Fish arrive strong and healthy by this quick mode of transportation, and losses are light as compared with those of consignments making the five-day journey by sea.

The colony is now aiming at a yearly production level of from 5,000 to 7,000 lb. of carp per acre of pond, and the establishment of a Fish Culture Research Centre at Penang will provide essential data for the extension of this source of food.

The colony's programme also provides for the training of students at the Centre, and trainees are to be received from other colonies so as to encourage carp breeding in other parts of the world.

Eire has Cream Again

The restriction on the use of cream, which had been in operation since August, has now been removed by the Eire Minister for Agriculture.

Fish Canning Merger

A large merger is reported to have taken place in the fish canning industry in South Africa. The new company, which was registered under the name United Fish Canners, Ltd., has taken over the interests of several well-known firms owning altogether a total of six modern fish canneries, a fleet of fifty motor fishing vessels, and other specialised equipment.

Mineral Oil Regulation in South Africa

The Department of Health in South Africa intends to add a regulation to the Food and Drugs Act prohibiting the preparation of cooked food, in the manufacture or preparation of which any mineral oil has been used, for purposes of sale.

Mineral oil may, however, be used in bread-cutting machinery, for the lubrication of bread pans, and for the lubrication of slabs and pans used in the manufacture of sweets.

Lectures on Food Storage

Problems of food storage in the Middle East was the theme of a series of lectures given in Iraq and Egypt recently by Mr. E. V. B. Herford, director of the D.S.I.R. Pest Infestation Laboratory at Slough.

The tour was arranged by the British Council with the co-operation of both the Iraqi and Egyptian Ministries of Agriculture, and Mr. Herford spoke to groups of government officials as well as to scientists and those engaged in commerce. His lecture subjects included "Control measures in grain storage," "The use of contact insecticides," "The organisation of research, inspection, and control work in the United Kingdom," and "Pest control in stored products."

Irish Food Company Registers

P. Kavanagh and Sons, Ltd., have been registered in Eire as a private limited company with a nominal capital of £200,000, divided into shares of £1 each. The new company are to acquire the business of jam, preserve, meat and provision manufacturers, canners and packers, carried on at Sunshine Works, Crumlin Road, Dublin, or elsewhere, under the style of P. Kavanagh and Sons.

German "Pineapple"

The canning factory "Helvetia" at Gross-Gerau, in the U.S. zone Province of Hesse, has put a new fruit on the market. A cross-breed of pumpkins and pineapple, the fruit is claimed to differ only slightly in taste from natural pineapple. Cultivation of the new product, which hitherto has been on a small scale only, is to be expanded considerably this year.

Australia's "Super Pig"

For some years, Mr. E. A. Wilcox, of Gawler, South Australia, has been experimenting to produce a breed of pig with superior characteristics.

The original aim was to evolve a fixed strain combining the white flesh, fine quality, and fecundity of the Canadian Large White breed with the early maturity, extra vigour, and lean flesh of the Saddleback. The Large Whites used in the experiments were the progeny of pigs imported from Canada, and the Wessex Saddlebacks have taken prizes at leading Australian shows.

A recent litter of fourteen all-white piglets closely approach the type sought by Mr. Wilcox. One feature of this cross-bred litter is that the piglets all display characteristics of the Danish Landrace type, with short heads and slightly drooped ears. It is now proposed to cross the best boar of the litter with several picked sows of the same litter in the hope of fixing the Landrace type.

Mr. Wilcox believes that if this type can be fixed it would be almost ideal for Australian conditions, especially in Queensland, where it has been found that the Saddleback cross helps to inure the Large White to a warmer climate.

Austrian Food Ventures

A meat canning plant is to be established at Gmunden, in Upper Austria, according to a recent report, while another Austrian firm, situated at Gmuend, which hitherto concentrated on the production of potato starch, is to begin the manufacture of barley products.

New Method Increases Butter Output

Considerable interest is being evinced in a new process which may result in greater production of butter in Australia without increased use of cream. The new method, which has been suggested by investigations carried out by the Council for Scientific and Industrial Research, involves no change in plant, is cheaper than the present method, and produces butter with greater food value.

The usual process of washing the butter granules is omitted; this increases the curd content, and results in 0·4 per cent. more butter. Applied throughout the Australian butter industry, the change would increase production by 600 tons a year.

Further experiments are being conducted with the help of several butter factories to determine whether the suggested method has any adverse effect on butter quality.

U.S. Weekly Report

A new four-page *Weekly Report on United States Business* is being published by the "New York Journal of Commerce" as a service to overseas businessmen who require comprehensive knowledge of American business conditions. Airmailed overseas each Friday, the new report is edited especially for overseas branch offices, special representatives, importers abroad, and major sources of supply of U.S. business firms.

Included in this concise weekly report is a brief discussion of the entire business week, its implications and possible consequences, events of concern to most businessmen, a market report on a wide range of commodities and goods, including the current prices of such materials, and complete news coverage in finance, shipping, textiles, chemicals, drugs, food, petroleum, and other business fields.

Chocolate Substitutes

The production has been started recently in South Germany of "Schicolana," a product made entirely from raw materials available within the country. The producers hope for a monthly output of 400,000 bars of the new product, which is protected by patent rights. "Schicolana" does not fall into the "sweets" category so far as its composition is concerned, but should be classified as a foodstuff.

Another factory in South Germany has been producing for some time past a chocolate-like foodstuff called "Pistolade," which contains sugar, fat, and other nutritives.

Loan Helps Iceland's Fishing Industry

Additional details regarding the use of the 2,300,000 dollar loan to Iceland under the European Recovery Programme have been made public in Paris by the European Headquarters of the Economic Co-operation Administration. The loan was the first to be approved in the E.C.A. loan programme.

Procurements totalling 1,900,000 dollars have already been authorised under the loan to rehabilitate and expand Iceland's fishing industry, a substantial amount of the products of which comes to the United Kingdom. The E.C.A. credit will finance the acquisition cost of United States machinery, equipment, supplies, and attendant services designed to increase the production and processing of fish oils and related products and their exportation.

The first half-million dollars were made available to obtain purse-seine nets for the island's fishermen. Another half-million dollars had been allotted for the purchase of a freighter and the cost of installing special supplemental equipment in the vessel.

The other 900,000 dollars thus far authorised are to be used for the procurement of machinery for new herring oil and meal factories. Over half this total will go to build a herring reduction factory, including equipment for solvent extraction. Machinery for processing herring oil and meal will be shipped to factories at five different points in Iceland.

Battery of several large Pneumatic Scale Corporation wrappers in operation at the Pittsburg Mills, Springfield, Illinois. Various flour products are manufactured here, including pancake mix.

Mauritius Sugar Industry

Recommendations for the development of the Mauritius sugar industry contained in the report of the Mauritius Economic Commission, 1947-1948, stress that all field assets should be brought to an even higher standard of efficiency so as to ensure the production of an annual target of 400,000 tons of sugar on the minimum area of good cane land and with due regard to the efficient use of manpower. An adaptation to Mauritius conditions of the technical progress made in other cane areas could be a powerful factor in speeding efficiency and economy.

A general rehabilitation of factories and the replacement of the crushing mills are necessary, and research into sugar cane should be intensified.

The payment of workers on a task or piece-work basis and the arrangement of various facilities for workers' families are also recommended.

Other aspects of the Mauritius economy dealt with in the report include recommendations for the investigation of the development of a larger home market for Mauritius tea together with costs of production and distribution, the continuation of research work on tobacco, and the introduction of a contributory National Health Insurance scheme, as well as many suggestions for new and amended legislation.

Trade Mark Application Granted

An application by Mr. John Augustine MacDonnell of Dublin for the registration of a trade mark "Befex" was allowed by Mr. E. A. Cleary, the Eire Controller of Industrial and Commercial Property, on December 10.

Registration was opposed by Beefex Products, Ltd., of London.

The Controller, delivering his decision, said that the applicant claimed no user, but that the mark had been accepted, and had been advertised, and that following upon this, its registration had been opposed by Beefex Products, Ltd., who claimed that their mark was registered in Great Britain, though it had not been registered in Eire. The opponent was relying upon prior user, before the date of the application for registration. The question was whether the opponent had justified his claim to prior user in Eire.

It had been admitted by the opponents that they had not used their mark in Eire since 1934.

It was claimed by Beefex Products that whatever trade they did in Eire prior to 1934 had made a mark in the minds of the public, so far as the word "Beefex" was concerned. In or about the year 1934 the company was obliged to discontinue the sale of their products in Eire owing to the imposition of restrictions on importation.

There was, however, no evidence that a single copy of any issue of any paper containing such an advertisement ever reached the hands of a single individual in Eire. The claim that the word "Beefex" had been kept before the public by way of advertisement therefore failed.

Beefex Products had stated that it was their intention, when things improved, to resume their trading, but the Controller thought that three things were necessary before they came back into trade. The British Government's restrictions would have to be relaxed; in order to enable them to compete with their rivals in Eire (and there were many rivals), the import duty would have to be abolished, or ameliorated in their favour; and the Package Tax would require to be withdrawn.

These factors might make future trading very remote indeed, and to allow the opposition to the registration would, in the Controller's view, amount to recognition of a dog-in-the-manger attitude.

The "Beefex" mark had been registered in England, completely and absolutely ignoring the existence of the trading in Eire. There had been no thought of the Eire registration system until there appeared on the market like goods under the same or a similar mark.

Air and CO_2 Volume Tester

A new sampling device to aid in the determination of the air content of liquids, whether carbonated, partially carbonated, or uncarbonated, has been developed in the U.S.A. The sampling container consists of a transparent methacrylate plastic body with stainless steel head and base. The head and base are fitted with valves and tube connections to control the flow of the liquid to be tested and the carbon dioxide used for counter-pressure. The head also has a "mouth" which is capped with a standard crown closure.

In operation, the sampling device is first purged of air by means of carbon dioxide gas and it is then filled to the graduation mark with the liquid to be tested. The air content is measured by connecting the piercing device assembly of an air and CO_2 volume tester to the crown-closed "mouth" of the sampling container.

News from the Ministries

Oils and Fats

No change is being made in the prices of refined oils and imported edible animal fats allocated to primary wholesalers and large trade users during the eight-week period ending March 26, 1949.

Committee on Bread Improvers

Sir Edward Mellanby, secretary of the Medical Research Council, is on a committee of scientists set up by the Ministry of Food to enquire into bread improvers. The committee have been asked by the Ministry to review the effects of the particular improver—nitrogen trichloride—known as agene.

Mustard Seed

Following the announcement made jointly in September, 1947, by the Ministry of Agriculture and Fisheries and the Ministry of Food that mustard seed would be freed from price and other controls from 1948 onwards, the Minister of Food has now revoked the Mustard Seed Order, 1945, as amended. The revocation came into effect on January 2, 1949.

Anglo-Canadian Wheat Agreement

Representatives of the United Kingdom and Canadian Governments have had discussions on the price to be paid by the United Kingdom for Canadian wheat in 1949-1950, the fourth and final year under the United Kingdom-Canadian Wheat Agreement of 1946. After taking into account all relevant considerations including, but without attempting to reach a final settlement of, the United Kingdom obligations under Clause 2 (*b*) of the Agreement, the two Governments have agreed upon a price of two dollars per bushel.

The two Governments have also agreed that their representatives shall meet not later than July 31, 1950, to settle any obligations of the United Kingdom which may then still be outstanding under Clause 2 (*b*) of the Agreement. The extent to which any such obligation will remain will depend largely upon the actual prices ruling for wheat during 1949-1950.

Cheese from Hungary

A list of firms that imported cheese from Hungary before the war is being compiled by the Ministry of Food. Any such firms that are not already in touch with the Ministry are invited to communicate with the Milk Products Division at London Road, Stanmore, Middlesex.

Import of Dead Game

Dead game birds, dead wild birds, dead guinea fowl, and dead hares may be imported without restriction as to quantity under open licence from East and West Africa, Eire, France, Holland, China, Denmark, Iceland, Norway, Sweden, and Yugoslavia during the period ended June 30, 1949.

Holders of existing open individual licences prefixed W.G.B. need not apply for fresh licences. The existing licences will be accepted by H.M. Customs up to June 30, 1949. Importers not holding open individual licences to import dead game birds, dead wild birds, dead guinea fowl, and dead hares and wishing to do so should apply on form I.L.D.A. in the first instance to Meat and Livestock Division, Ministry of Food, Bryn Euryn, Dinerth Road, Colwyn Bay, Denbighshire.

Post-Graduate Scholarships

A limited number of post-graduate scholarships in husbandry, agricultural economics, statistics, and agricultural and dairy engineering are to be awarded by the Ministry of Agriculture and Fisheries and the Department of Agriculture for Scotland for the academic year beginning October 1, 1949, or earlier.

The closing date for applications is May 15, 1949.

Further particulars may be obtained from the Secretary, Ministry of Agriculture and Fisheries, or the Secretary, Department of Agriculture for Scotland, St. Andrew's House, Edinburgh, 1. Applicants resident in Northern Ireland should apply to the Ministry in London.

Ware Potatoes

Maximum wholesale and retail prices for maincrop potatoes from February 1, 1949, until the end of the season have now been prescribed by the Minister of Food in The Ware Potatoes (1948 Crop) (Amendment) Order, 1949. This amending Order also removes the remaining restrictions on the marketing of certain long-keeping varieties of potatoes.

Amendment to Bread Order

The amendment to the Bread (Control and Maximum Prices) Order, 1947, which came into force on February 7, 1949, removes the prohibition on the buying and selling of loaves of bread with paper bands round them; adds three brands of bread to the list of breads which may be sold free of price control provided the seller has national bread on sale; and amends the description of two other sorts of bread which are free of price control.

Bakers banding their bread should make sure that the wording on the bands complies with the requirements of the Defence (Sale of Food) Regulations.

Cocoa, Chocolate and Confectionery Prices

The general reduction in the prices of cocoa, chocolate, and chocolate and sugar confectionery is due partly to the recent reduction in the price of raw materials which has already been announced, and partly to a reduction of manufacturers' and distributors' margins.

In addition to other reductions in price, the maximum price of cocoa butter will be reduced from 4s. 11½d. to 4s. 4½d. per lb., and the new maximum prices of chocolate couverture will vary from 1s. 11¼d. to 3s. 2½d. per lb. according to grade.

The new prices (other than for chocolate couverture) came into force from February 27 as the new stocks became available in the shops. The new prices for chocolate couverture, which apply to manufacturers' sales only, came into operation on February 13.

1949 Crop Carrots

The present system whereby the Ministry guarantees to buy standard grade carrots which growers may be unable to market through normal channels will be continued for the 1949 maincrop.

Northern Ireland Appointment

Mr. D. A. E. Harkness, C.B.E., senior assistant secretary in the Northern Ireland Ministry of Agriculture, has been appointed secretary in succession to the late Dr. G. Scott Robertson.

Mr. Harkness, who has a wide reputation in the agricultural economics field, was responsible for important organising work behind the Milk and Milk Products Act, 1934, the Egg Marketing Scheme of 1936, and the Pig Marketing Scheme.

Engineering Mission to Canada

The Government-sponsored United Kingdom Engineering Mission, under the leadership of Mr. (now Sir) E. H. Gilpin, which toured Canada from August 28 to October 16, 1948, has now submitted its report to the President of the Board of Trade.

This report, consisting of some forty to fifty pages, with a foreword by the President, gives a clear account of the special Canadian conditions affecting sales of U.K. engineering equipment, openings for particular sections of the engineering industries investigated by the Mission, what the U.K. exporter must do to gain and hold volume trade, representation of firms and sections of the industry, advice on publicity, labour conditions, etc., and other information, including two maps and statistical appendixes.

The Mission has unanimously come to the conclusion that there is a solid and expanding market in Canada for a variety of U.K. engineering equipment, and the national need demands that manufacturers make every possible effort to increase the export of such equipment to Canada. Finally, the Mission brings important specific recommendations to the urgent and earnest consideration of all engaged in the manufacture and export of engineering equipment.

Monopolies and Restrictive Practices Commission

The following have been appointed members of the Monopolies and Restrictive Practices Commission by the Board of Trade:

Sir Archibald Carter, K.C.B., K.C.I.E. (Chairman)
Mr. C. N. Gallie
Mr. Frederick Grant, K.C., M.C.
Mrs. Joan Robinson
Sir Harold Saunders
Mr. Gordon Stott
The Hon. Josiah Wedgwood
Mr. R. E. Yeabsley, C.B.E.

Dame Alix Kilroy, D.B.E., at present Under-secretary at the Board of Trade in charge of Industries and Manufactures Department, Division 1, has been appointed secretary to the Commission to which she is being seconded for the period of the appointment.

The Commission is set up under the Monopolies and Restrictive Practices (Inquiry and Control) Act, 1948. It will not initiate enquiries but will investigate matters referred to it by the Board of Trade under the Act. Any correspondence should be addressed for the time being to the Assistant Secretary, I.M.1 Division, Board of Trade, Millbank, S.W. 1.

Fresh Fruit and Vegetables

The following additions have been made to the list of items which may be imported as from January 12, 1949, under the open individual licensing arrangements previously announced.

The additional commodities and the countries concerned are:

Beans, green (up to May 31 and from November 1 to December 31)—Italy.
Cherries—Italy.
Chicory (up to March 31)—Holland.
Cucumbers—Holland.
Lettuce, endive, and batavia (up to May 31 and from November 1 to December 31)—Holland.
Peas, green (up to May 31 and from November 1 to December 31)—Italy.
Radishes (up to April 15)—France, French North Africa, and Holland.
Strawberries—Italy.

The dates shown in brackets against certain items in the list indicate the restricted periods during which these items may be imported, but it must be understood by all importers that under the open licensing arrangements it may be necessary at any time to discontinue or suspend without warning the further import of any of the commodities shown in the list.

The necessary arrangements with H.M. Customs and Excise have been made. Importers who already hold open licences (prefix Nos. O.S.F. for Italy and O.F.F.V. for other countries) will be allowed, without amendment to their existing licences, to import during the permitted periods both the commodities mentioned and those previously mentioned from the countries named against each commodity.

Applications by importers not already holding such licences should be submitted in the first instance to the Ministry of Food, Fresh Fruit and Vegetables Division, Import Section, Carlton Hotel, Pall Mall, London, S.W. 1.

Anglo-Polish Agreement

Under a five-year Trade and Finance Agreement with Poland recently signed in Warsaw there is foreseen an exchange of goods up to the end of 1953 of about £130 million each way, including supplies from Poland on an increasing scale of bacon, eggs, and other agricultural products and timber, and the purchase by Poland of raw materials and manufactured goods including capital equipment. As regards foodstuffs, Poland is assured of a market which will enable her to adapt her production, particularly of bacon and eggs, to the needs of the United Kingdom, and the United Kingdom is for its part assured of such supplies, including winter eggs. In the case of timber, Poland accepts a firm commitment for 1949, and for a three-year period from 1949 to 1951, and has undertaken to do her best to reach the targets for softwood and pit props in particular which are specified in the Agreement. Poland will obtain supplies of wool, rubber, crude oil, semi-manufactured copper goods, tyres, dyestuffs, and other goods, and will continue to place in the United Kingdom orders for capital equipment.

The existing £6 million credit for the purchase of capital equipment will be converted into a revolving credit within the same limit.

Information and Advice

Ginger Marmalade

B.3117. *Can you inform us what is the correct percentage of preserved ginger that should be used in the manufacture of ginger marmalade, and can this be made with pectin?* (Lincs.)

In the manufacture of ginger marmalade, stem ginger should be used if possible. The syrup should be drained off and the ginger passed through a mincing machine using ¼ in. plate. A recipe which could be used as a basis for experiment is as follows:

Sugar	68 lb.
Drained ginger (minced) ...	32 lb.
Ginger syrup	8 lb.
Water	12 lb.
Pectin	6-8 lb.
Citric acid	4 oz.

The approximate total weight of this mixture will be 126 lb. and it should be boiled to a final weight of 112 lb.

Soft Icing for Cakes

B.3134. *Can you please supply us with a recipe for soft icing for cakes?* (Herts.)

The following recipe is given as a basis for experiment:

4 lb. sugar 1 pt. water 3 grams cream of tartar	Boil up quickly to 240° F., taking the usual precautions against graining.
½ pt. egg whites ¼ oz. salt Vanilla essence	Whisk to a light foam during the boiling of sugar.

As soon as the sugar solution is ready, it should be poured slowly over the egg white foam and whisked for a few minutes, then poured quickly over the cakes. Care must be taken not to grain the mixture

A very similar type of soft icing sugar for covering cakes can be obtained by mixing 4 lb. well prepared royal icing into 4 lb. prepared fondant.

The fondant is heated to 120° F. over a bain marie and softened down with water to a creamy consistency; the royal icing is added to the fondant, mixed in quickly, and used while still warm to mask the cakes.

Turkish Delight

B.3158. *I should be pleased to receive a recipe for Turkish Delight.* (Eire.)

The following recipe could be used as a basis for trial:

Crystal sugar	60 lb.
Cornflour (good quality) ...	20 lb.
Icing sugar	20 lb.
Cream of tartar	2 oz.

The crystal sugar is boiled with the cream of tartar in the usual way to 260° F. To this is added the cornflour, after creaming in 20 lb. of cold water, and the icing sugar. The whole is cooked slowly until the required set is obtained, usually at about 225° F. The necessary colours and flavours are added, and if desired a small quantity of tartaric acid. For cooling, the mixture is poured into wet tins or well-starched wooden boxes and then cut and dusted in icing sugar. The icing sugar in the recipe may be replaced with glucose if desired, using about 100 per cent. more. In this case the cream of tartar should be omitted and the glucose must be boiled with the crystal sugar instead of being added afterwards.

Information Supplied

B.3100. *Manufacturers of small-scale bottling and labelling machinery.* (Lancs.)

B.3101. *Names and addresses of suppliers of carob juice.* (Glam.)

B.3104. *Suppliers of stainless steel containers and buckets.* (London.)

B.3116. *Suppliers of lecithin.* (Eire.)

B.3120. *Manufacturers of continuous frying equipment for production of potato crisps and suppliers of an electric crimping machine.* (Lancs.)

B.3122. *Manufacturers of aluminium pudding basins.* (London.)

B.3123. *Manufacturers of heat resisting gloves, preferably faced with non-porous or non-toxic material, suitable for the handling of foodstuffs.* (Suffolk.)

B.3125. *Producers of albumen concentrate from fish, and literature on the preparation of albumen from fish.* (Bucks.)

B.3127. *Suppliers of monosodium glutamate.* (London.)

B.3129. *Suppliers of automatic weighing and packing machinery.* (Northumberland.)

B.3136. *Manufacturers of vacuum units for use in the softening of date blocks.* (London.)

B.3140. *Manufacturers of small-scale mixing machinery.* (London.)

B.3141. *Suppliers of canning plant for meat products.* (Eire.)

B.3142. *Suppliers of unrationed edible oil.* (London.)

B.3143. *Manufacturers of plastic caps suitable for sauce bottles.* (Eire.)

B.3144. *Manufacturers of small continuous frying equipment for potato crisps.* (Lancs.)

B.3148. *Suppliers of flavours for tomato sauce and ketchup.* (Midlothian.)

B.3152. *Manufacturers of cleansing solutions for glass tubes.* (Lancs.)

B.3156. *Firms of colour printers specialising in designs on cellulose film sheets.* (Durham.)

B.3159. *Suppliers of ramps.* (Lincs.)

B.3161. *Manufacturers of mineral water machinery.* (Lancs.)

B.3162. *Manufacturers of a small portable conveyor for use in the baking trade.* (Northants.)

B.3165. *Firms specialising in the manufacture of plant for the pasteurisation of fruit in 26 oz. glass bottles.* (Yorks.)

B.3166. *Suppliers of China soy.* (Eire.)

B.3219. *Name and address of manufacturers of "Camelia" margarine.* (Switzerland.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 2s. each.

609,290. FAIRWEATHER, H. G. C. (Inter-Seal Corporation): Closures for bottles and like containers.

609,339. COE, M. R.: Dried fruit product and method of making same.

609,409. DUMBRILL PLANT AND ENGINEERING CO., LTD., and DUMBRILL, A. W.: Dough mixing and kneading machines.

609,495. FITZPATRICK, H. J. (Seltman, C. von G.): Method of roasting coffee or cacao beans, nuts, and grains.

609,450. SCHOU, H.: Manufacture of fish preserves.

613,937. NOYES, H. A.: Freezing comestibles with compatible solutions.

614,139. LABORATORIES MEDIAL SOC. ANON.: Processes for the preparation of aromatic coffee extracts.

614,251. BAKER PERKINS, LTD., and KIRTLEY, T. W.: Ovens for baking bread and the like.

Abstract of a Recent Specification

Separation of Sugar from Molasses

Although the production of sugar from beets or sugar cane has reached a high degree of perfection it is not possible to obtain the whole amount of sugar present in the beet or cane, and always a by-product, the so-called molasses, remains which still contains a considerable proportion of sugar.

An object of the present invention is to separate the greater part of the sugar present in the molasses in a solid form in a simple and economic manner.

According to the process the molasses are passed through an organolite, charged with hydrogen ions and obtained by the treatment of coal with strong sulphuric acid, oleum or sulphur trioxide, not more than two parts of molasses (calculated as solid matter) being passed through one part of organolite. Thereupon the percolate is neutralised and subjected to evaporation in order to crystallise out the sugar. The sugar may then be separated by centrifuging.

The neutralising of the percolate is preferably effected by means of calcium oxide, since better results and a higher sugar yield are obtained by employing this neutralising agent.

The percolation through the organolites must be effected at such a velocity and at such a temperature that practically no inversion takes place.

By the treatment with organolites not only the greater part of the metals is removed, but also the greater part of the proteins. After neutralisation of the percolate, *e.g.* by means of lime, whereby the metallic ions removed are replaced by calcium ions, a rise in purity of the solution is found to have been obtained. When no more than two parts of molasses (calculated as solid matter) have been passed over one part of the organolite this must be regenerated. For this purpose it is first intensely washed and agitated with water whereby the organic impurities, particularly protein compounds, are removed. Thereafter the organolite is treated with an acid solution for removing the adsorbed metallic ions and charging the organolite with hydrogen ions, and finally it is washed out with water.

The organolite is then ready for reuse for the treatment of molasses.

606,908. *N.V. Octrooien Maatschappij "Activit."*

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

JAEGER.—661,442. Brisling, kippered herrings, herrings, anchovies, fish balls, and sandwich spread consisting of cod liver and cod roe, all being canned goods. **Jaegers, Limited, Aktieselskap** (a company incorporated under the laws of Norway), Stavanger, Norway; Manufacturers and Canners.

GANWICK.—662,539. Machinery for processing tea. **Lillico and Van Den Bergh, Ltd.,** also trading as the **Market Prices Company,** 36, Lime Street, London, E.C.3; Merchants.

NUTRIMAX.—662,937. Infants' and invalids' foods. **Marshall's Food Products, Ltd.,** 41-43, Dockhead, Tower Bridge, London, S.E.1; Manufacturers.

NORPEL.—663,287. Vinegar. **Norman Pell (Sales), Ltd.,** 17, Market Square, Northampton; Merchants.

SCRAPATISER.—663,747. Flavourings (other than essential oils) for food. **Market Services, Ltd.,** 20, St. Alkmunds Churchyard, Derby; Manufacturers and Merchants.

New Companies

Jeff Field (London), Limited. (460445.) Sir William Wright Dock, Hull. To carry on business of fish merchants and curers, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: G. Field, Woodfields, Southfield, Hessle, Yorks; W. H. Ashby, Brackensgill, Southfield, Hessle, Yorks.

Porosan Institute, Limited. (460462.) 103, Cannon Street, E.C.4. To promote the general advancement of the preparation, preservation, and distribution of food and foodstuffs, etc. Nom. cap.: £100 in 5s. shares. Dirs.: W. Engel, Bramley Cottage, Lyndhurst Drive, Harpenden, Herts; H. J. Wells, 17, Oakhurst Rise, Carshalton Beeches, Surrey.

Harry Powell, Limited. (460593.) 248, Belgrave Road, Birmingham, 12. To take over business of a bakers' sundriesman carried on at Birmingham by Harry Powell. Nom. cap.: £6,000 in £1 shares. Dirs.: H. Powell, 1391, Stratford Road, Hall Green, Birmingham, 28; C. Hoare, 1421, Stratford Road, Hall Green, Birmingham, 28; Florence E. Powell, 1391, Stratford Road, Hall Green, Birmingham, 28.

J. Entwistle, Limited. (460601.) Siddall Street, Radcliffe, Lancs. To take over business of pickle and jam manufacturers carried on by the personal representatives of the late Joseph Entwistle at Radcliffe. Nom. cap.: £5,000 in £1 shares. Dirs.: to be appointed by subs.; Subs.: J. W. Heywood, 10, Price Street, Bury (clk.); G. Monks, Hycliffe, 45, Radcliffe New Road, Whitefield, Manchester (solr.).

Cowley Casing (London), Limited. (460655.) 8, Marylebone High Street, W.1. To carry on business of sausage casing dealers, etc. Nom. cap.: £11,000 in £1 shares. Dirs.: H. C. Cowley and Edith F. Cowley, 53, Hertford Avenue, East Sheen, S.W.14.

Wonder Bar Potato Crisps (Southend), Limited. (460731.) 18, Maddox Street, W.1. Nom. cap.: £100 in £1 shares.. Dirs.: H. Sterling, Peacehaven, London Road, Merstham; B. Michaels, 22, Kent View Road, Chalkwell, Essex.

Rumfitts, Limited. (460921.) 31, Railway Road, Darwen. To carry on business of bakers, etc. Nom. cap.: £2,000 in £1 shares. Permt. dirs.: G. E. Rumfitt, 31, Railway Road, Darwen; F. Rumfitt, 22, Atlas Road, Darwen.

Bruces Banquet Products (Birmingham), Limited. (460999.) 14, Naseby Road, Alum Rock, Birmingham. To carry on business of bakers, confectioners, and pastrycooks, etc. Nom. cap.: £50,000 in £1 shares. Permt. dirs.: R. W. Bailey and B. Lotherington, 50, Alderbrook Road, Solihull, Warwicks.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.